THE WELDING ENGINEER

MAY, 1953

This Month:

NWSA CONVENTION

May 11-13, Cincinnati, Sheraton-Gibson Hotel

In recognition of the annual convention of the National Welding Supply Association, four articles on various phases of welding distributor activities will be found in this issue. One article covers distributor advertising. Another is mostly about personal selling. A third discusses exhibits at the state fair and other expositions. The fourth is on general problems of store operation.

The "film" on the right pictures three forms of distributor selling. In picture 1, Ken Brown (right), of Essex Welding Equipment Co., Inc., Newark, N. J., is calling on customer William Bender, of Manning & Lewis Co., Newark. Picture 2 shows the handsome showroom of Craig Welding Supply, Los Angeles. Picture 3 is the tent of Ill.-Mo. Welding Products Co. at the Illinois State Fair in Springfield.

35 CENTS

A McGRAW-HILL PUBLICATION

RUGGED DEPENDABLE CABLE

FOR 50 YEARS Wiremakers for Industry

To You,

Belden's Golden Anniversary Means

—product performance that can come only from a "know-how" that has grown through actual service since the early days of the construction industry.

—an ability to cooperate in pioneering new wires to meet or anticipate industry's growing needs.

In the years that follow This Belden Program Is—

TO BE CONTINUED

● Belden Welding Cable represents the best in a balanced cable design, meeting all service requirements without sacrificing any one of them. The conductor, the separator, and the jacket are designed to convey the maximum electrical energy to the electrode at all times, assuring a more stable arc.

Each cable is conditioned for flexibility, twisting, abrasion, impact, and heat. Other properties include high resistance to aging, moisture, oils, most acids, and alkalies. Specify Belden.

Belden Manufacturing Co.
4677-A W. Van Buren St.
Chicago 44, Illinois

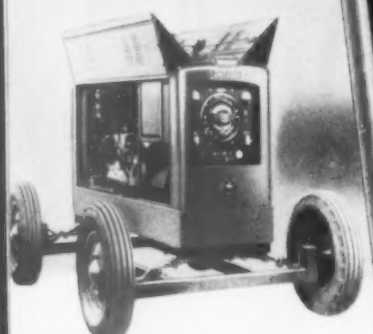
Belden *Welding* CABLE

HOBART 300 amp. Portable Electric Drive DC Welder

HOBART ARC WELDERS

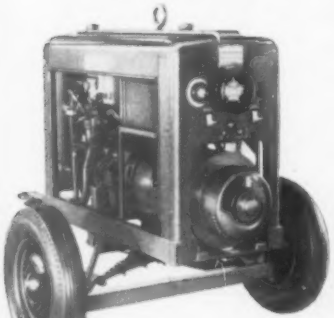
"ONE OF THE WORLD'S LARGEST BUILDERS OF ARC WELDING EQUIPMENT"

Here's the RIGHT COMBINATION for...



Gas Engine Drive Welder

...faster welding at lower cost!



"Pipeliner" Gas Drive Welder

Nothing is more essential to profitable welding than lower costs and constant speedy performance.

Hobart Welders and Hobart Electrodes are designed to give you the most efficient welding performance. Don't take our word, check any welder point by point against a Hobart and you'll soon see why advanced design, heavy duty construction, remote control have earned HOBART WELDERS the top position in every branch of welding. The coupon will bring you complete details—mail today.

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☐ "How to get better welds."
Valuable new vest pocket booklet.

HOBART BROTHERS COMPANY, BOX U-53, TROY, OHIO

Without obligation, send information on items checked below:
☐ Electric Drive Welder ☐ Gas Drive Welder ☐ Pipeliner Welder
☐ Bantam Champ Welder. Send me ☐ Welder Catalog ☐ Electrode Catalog ☐ Accessory Catalog.

NAME _____ POSITION _____

FIRM _____

ADDRESS _____

CESCO RIGHT... before your Eyes!

NEW!

No. 401-7F with STATIONARY LENS HOLDER

No. 401-2F with LIFT-FRONT LENS HOLDER

FIBER GLASS WELDING HELMETS

• Here's a brand new fiber glass welding helmet by CESCO that is not affected by heat or moisture . . . and it won't warp or buckle. Thousands of tiny glass fibers are moulded under great pressure into a strong, tough one-piece shell which has satisfactory high heat insulating qualities.

Exterior finish is smooth and easy to clean. Interior is dull-coated to reduce reflections. Standard 2" x 4¼" lenses.

CESCO Fiber Glass Welding Helmets are designed for safety and comfort. They are light in weight and have form-fitting headgear with easily adjusted leather sweatband. They're—*"Right... before your Eyes."*

Send TODAY
for CESCO literature and the name of your CESCO safety equipment distributor

CHICAGO EYE SHIELD COMPANY • 2330 Warren Boulevard, Chicago 12, Illinois

CESCO FOR SAFETY

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MAY, 1953

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THE JACKSON

New Lift-Front Helmet

See it...Try it

✶ Plastic Lens Holder

✶ Improved Helmet Shell

✶ Improved Headgear

✶ **Lens Holder** has hinged front, holding welding lens and cover glass. It permits inspection of work without raising the entire helmet—a great advantage, especially for work in close quarters. Made of high-impact, compression molded, thermosetting plastic, it is strong and durable. Coil springs are built inside the hinges to hold front up or down. Another clear glass is held in aluminum inner retainer and stays in fixed position to keep out flying particles. All glasses are replaceable without tools.

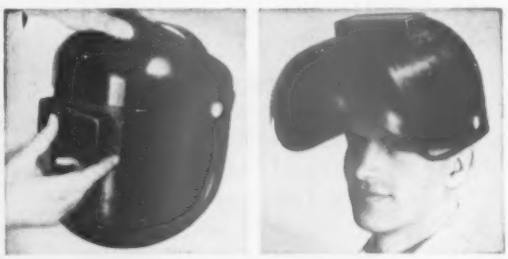
ARC WELDING HELMET
with Lift-Front ..... Type **H-2**

ON BOTH JACKSON HELMETS . . .

✶ **One-Piece Helmet Shell** is now made of a thermosetting plastic, reinforced with glass fiber, combining all the advantages of resistance to heat, moisture, high voltage and spatter with even greater strength, and even better appearance than before.

✶ **Headgear** has wider and more flexible straps for greater comfort, made of smooth plastic, easy to clean. There's no trial-and-error adjusting it to size. Calibrated to hat sizes in ⅛-inch increments, it is quickly made to fit before putting it on. The cork padded sweatband, held by snap buttons, is inexpensive to replace.

Try on either Helmet. You, like other weldors, will particularly like the Jackson-developed friction pivots. They are easily adjusted to your needs, by hand, from the outside, without taking the helmet off. The helmet can thus be made to float down without jolting stops, or to stay in any desired position. This unique feature eliminates the need for chin straps and other cumbersome inside gadgets.



Cover glass slides out without disturbing the filter lens . . . Plastic shell swings up on adjustable friction pivots.

Now—Lighter than Ever!

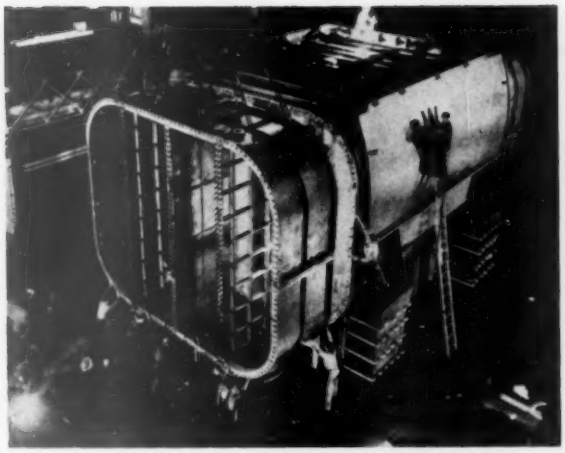
Jackson's *stationary-front helmet*, the first with a one-piece thermosetting plastic shell, is now, with its new, light metal lens holder, being made lighter than before.

With its new shell and improved headgear, it will win friends among weldors everywhere.

ARC WELDING HELMET
with Stationary Front.....Type **H-1**

Sold world-wide through distributors and dealers. Jackson Products, foremost makers of arc welding electrode holders, ground clamps and cable fittings, also manufactures a line of gas welding goggles, grinders' goggles, eye and face shields.

JACKSON
PRODUCTS
WARREN · MICHIGAN



WORLD'S biggest steam condenser is assembled by welders at the Harrison, N. J., works of Worthington Corp.

800-KVA flash welder at Douglas Aircraft Co. turns out landing gear parts for giant transports and bombers

NEWS

Defense Materials System (DMS) to Handle Controls after July

SOMETHING new will be added to the Washington alphabet soon: DMS (for Defense Materials System). This is the government's new metals priority plan to take effect July 1 when CMP expires.

This is how DMS will work: The Defense Department and Atomic Energy Commission will issue quarterly allotments of steel, copper, and aluminum to their prime contractors to meet defense-order requirements. Contractors will also get preference ratings to buy necessary tools and components. Their priorities will be passed on to subcontractors and suppliers, who in turn will also get first crack at materials.

NPA will direct steel, copper, and aluminum producers to set aside specific tonnages for defense-rated business. Probable industry-wide set-asides for third quarter: steel, 15%; copper, 25%; aluminum, 30%.

Priorities will also be issued to selected defense-supportinng projects. But the government will be stingy in this regard. AEC or the Pentagon will have to specifically certify manufacturers or construction contractors for this type of rating. Examples: A machine-tool builder supplying an automotive equipment maker on military contract, an electric utility plant to power an atomic energy project.

That's all there is to DMS. There are no controls or priorities on steel, copper, and aluminum for non-defense consumers. Under CMP, quarterly metals allotments had been issued to all consumers—defense and civilian alike.

Some industries, petroleum, electric utilities, railroads, and farm machinery, have objected to the decision limiting priorities. They want treatment on a part with military and atomic energy contractors. But officials at the Office of Defense Mobilization, which becomes a permanent industrial defense planning agency, want to keep DMS as simple as possible.

One significant type of metals control will continue after June 30: complete allocations on such scarce materials as nickel-bearing stainless steel, nickel, cobalt, tantalum, columbium, molybdenum, titanium, and diamond bort.

* * *

100 Miles of Welded Pipe in Biggest Condenser

WELDORS are putting finishing touches on the largest steam condenser in the world at the Worthington Corp.'s Harrison, N. J. works. It will be installed in Consolidated Edison's New York East River Station to serve a 180,000 kw turbine generator. The tubes in this 125,000 sq. ft. condenser would reach from Newark, N. J. to Wilmington, Del.

40-Ton Force Exerted on Douglas Flash Welder

SOME manual arc welding will be eliminated on 200-passenger C-124 transport planes by the new 800-kva flash welder at Douglas Aircraft Co., Long Beach, Calif. Furnished by Taylor-Winfield Corp., the big welder was built to Douglas specifications for the job of welding steel landing gear components. It is 32-ft. long and will accommodate parts up to 12 ft. long. Maximum cross-sectional area it can weld is 12-sq. in.

Power is supplied by two 400-kva transformers in parallel circuit, with one supplying current to top and the other to bottom dies.

* * *

NWSA—May 11-13

Here is the program for the Ninth Annual Convention of the National Welding Supply Association at the Hotel Sheraton-Gibson, Cincinnati, O.:

Sunday, May 10th

3:00 to 9:00 p.m. Registration
4:00 p.m. NWSA board meeting

Monday, May 11th

9:00 a.m. Registration
10:00 a.m. President's address by G. M. Sims. General meeting
12:30 p.m. Luncheon
2:00 p.m. Contact booths

Tuesday, May 12th

9:00 a.m. Registration.
10:00 a.m. General meeting. Panel discussion. Talk on safety by H. F. Reinhard
12:30 p.m. Luncheon
2:00 p.m. Contact booths
6:00 p.m. Reception
7:00 p.m. Informal Dinner

Wednesday, May 13th

9:45 p.m. General session on distributor problems.

NEWS

from page 5

FEATHERWEIGHT body (132 lb) for Allard sports car attracted all eyes at the first Magnesium Exposition

EMPLOYEE-OWNED is the new Tucson, Ariz., building housing Aweco Supply Co. Dean Tillotson is the manager

132-Lb Car Body Stars at Magnesium Show

A SPORTS car body made of magnesium, and weighing only 132 lb was a featured attraction at the First International Magnesium Exposition, March 31, April 1-2 at Washington, D.C. About 25,000 visitors viewed such magnesium products as dockboards, ladders, crutches, cabinets, chairs, structurals, and aircraft wings. Perhaps the largest exhibit was a big 80%-magnesium, detachable, airborne cargo "pod" that can be hauled along the highway like a conventional road trailer. It is carried aloft by the Fairchild XC-120 parent plane.

Set on a British-made Allard chassis, the magnesium auto body was designed and developed by R. J. Cross, managing director of Essex Aero, Ltd., England. Mr. Cross says his company tests proved that 1) a magnesium car body is practical and lighter than any similar plastic body made with materials and methods known today, 2) a magnesium body can be cost-competitive with plastic and might be cheaper, 3) existing repair facilities, to say nothing of present production machinery can handle magnesium bodies, 4) magnesium promises the liklihood of ultimately discarding the orthodox chassis and incorporating it with the body itself.

Some weight on this body was saved by replacing the 39½-lb steel fuel tank with a 15½-lb magnesium tank. The body was built in sections, then inert-gas welded into one rigid unit. Rigidity in the rear part of the body is increased by including the rear seats and floor base as part of the whole welded structure. Also fixed to the body is the radiator grille, welded two feet forward of the radiator.

* * *

Production Rises 8% on Mild Steel Electrodes

DURING three years between Jan., 1950, and Jan., 1953, mild steel electrode production has increased 33,000,000 lb annually, about 8% higher than the 420,000,000 lb turned out in 1950.

Right now some manufacturers are quoting four to five months delivery on certain types. Delay is due principally to wire shortages. Electrode wire requiring close analysis cannot be made from scrap. It is also more difficult to hold diameter tolerances close when scrap is used.

* * *

$100,000,000 Exhibit at Tulsa Oil Show, May 14-23

BUILDING crews have been at work for weeks getting the grounds and exhibits ready for the International Petroleum Exposition at Tulsa, Oklahoma, May 14-23. Two tall masts for drill rigs have already been erected. More will be raised by opening day.

Some 1,500 exhibitors will display equipment and products valued at $100,000,000, at least one-third more than the 1948 staging of the exposition at Tulsa.

One oil drilling rig on display will be enclosed by an air-conditioned one-story structure to give viewers a respite from May heat.

Aweco Supply Co. Moves To New Tucson Headquarters

NEW and larger quarters at 800 So. Park Ave. in Tucson, Arizona, were recently occupied by Aweco Supply Co., a subsidiary of Arizona Welding Equipment Co., Phoenix. The new pumice block and brick building provides about 50,000 sq ft of sales, display and storage space and to serve gas customers has an 8,000 sq ft cylinder loading dock.

Special advantages of the store are a hydraulic lift for receiving and shipping heavy merchandise and off-street parking on three sides.

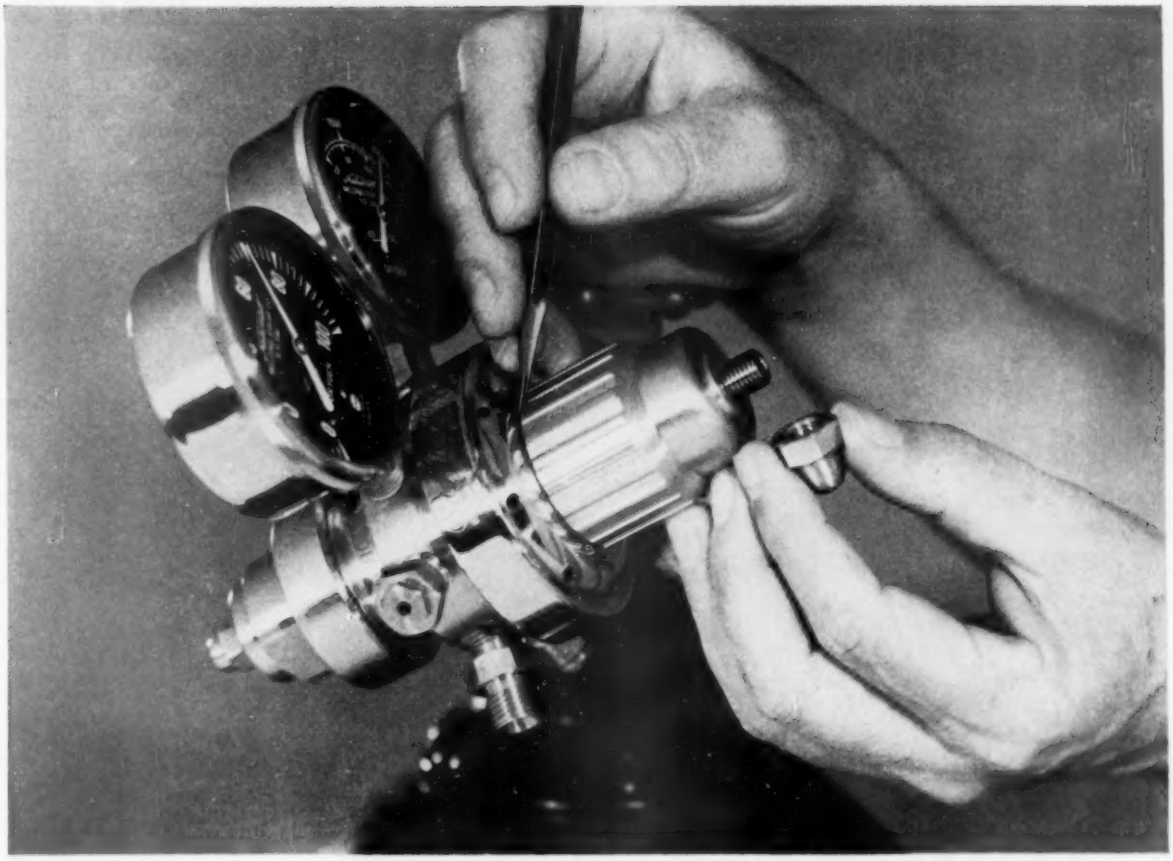
The building was purchased by a group of Aweco employes and leased to the company, so some of the men are in the peculiar position of landlords and renters of the same outfit. Altogether, there are 15 employees, including 3 outside salesmen and one oxygen and acetylene salesmen. When the branch was opened in 1946, it had only three employes. The Tucson branch covers all southern Arizona. The proportion of sales at Tucson runs about 65% welding equipment and supplies and 35% industrial equipment and tools, according to Dean Tillotson, manager. Joe Pruitt is sales manager.

* * *

March Steel Output Tops 10,000,000 Tons for First Time

MARCH was the month of greatest steel production in history, with an output exceeding 10,000,000 tons of ingots and castings. New production records were set week by week.

(More News on page 78)



from "hand-set" to "pre-set" in a jiffy;

and here's how this feature serves you...

Ordinarily, the majority of regulators are *hand set* by the operator. No regulator is as friction free, as easily hand set as is this one. However, where welding or flame cutting mass production operations, or any other valid reason suggests the presetting of a working pressure maximum to save gas consumption or control procedures, this regulator is so designed that it can be *pre-set* instantly . . . and without change of parts or trouble of any kind. Here's how it is done: First set the pressure —loosen the locknut—screw the bell down as far as possible —and refasten the locknut. That's all there is to it—Simple?

A 44 page booklet with 25 illustrations is yours FREE for the asking. Write for it today.

527

Made by National SINCE 1910 **WELDING EQUIPMENT CO.,** San Francisco 5, California

On the job with Invincible Model 460—a portable unit that is ideal when there are frequent changes in setup.

SALVAGE WELDING FLUX the *Modern Way*

with INVINCIBLE Recovery Units

FREE Folder on Flux Recovery
Illustrated case histories show how Invincibles save money on all kinds of installations. *Send for your copy NOW!*

On the average submerged arc welding installation, approximately 80% of the flux deposited on the weld can be reclaimed. Invincible Flux Recovery Equipment is designed especially for this particular operation. It affords the most efficient and economical way to handle the job. *Automatically,* all loose flux is recovered from the work. Fine dust and fused particles are removed. Only slag-free, dust-free, usable material is returned to the hopper of the welder in a continuous flow. The Invincible system saves costly man-hours over manual methods. It also increases production and reduces expensive rejects by eliminating fine dust (flux flour).

Thousands of Invincible Recovery Units have salvaged enough flux in a few months or even weeks to repay their cost . . . The complete Invincible line includes the correct type and size for *every* submerged arc welding job.

INVINCIBLE VACUUM CLEANER MFG. CO.
DOVER, OHIO

FOR 40 YEARS, LEADERS IN INDUSTRIAL VACUUM EQUIPMENT

12 MINUTES DOES YESTERDAY'S PROBLEM JOB!

They couldn't have done it this way a few years back. That box is made of 1/16" 52S aluminum — a problem alloy to weld. Today, with Airco Machine Heliwelding, Suckle Electronics Company, Camden, N. J., turns out one of these case boxes every twelve minutes. The four 15" seams that join the bottom pan to the sides take about 45 seconds each, as the Machine Heliweld Holder moves smoothly over them, carried by an Airco No. 20 Radiagraph. Heliwelding provides pin-point heat concentration for joining hard-to-weld metals . . . with a minimum of finish grinding.

For full information on Heliwelding, get in touch with your nearest Airco office.

When you need oxygen, acetylene, nitrogen, or other industrial or rare gases, think of Air Reduction. A nationwide distribution system is ready to supply your needs.

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AND OFFICES IN
MOST PRINCIPAL CITIES

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at the frontiers of progress you'll find

AN AIR REDUCTION PRODUCT

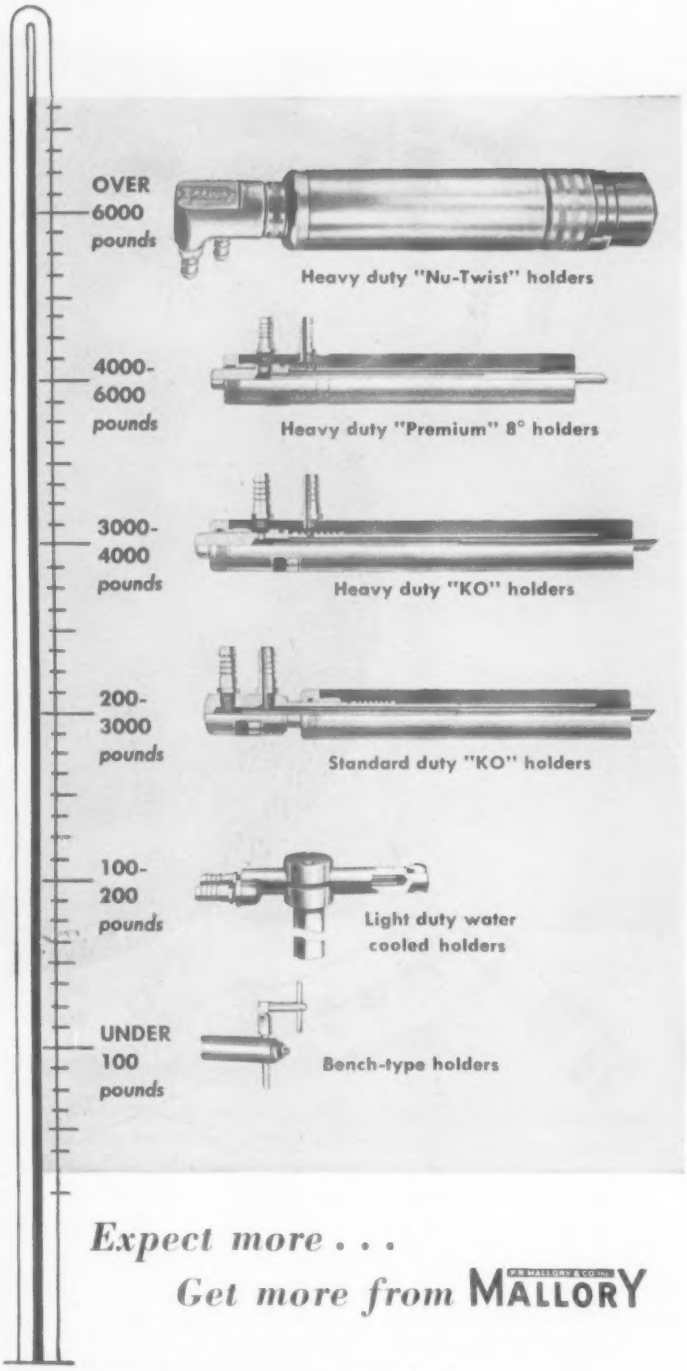
You Name The Welding Pressure . . . .

Mallory has the holders and electrodes in stock

Resistance welding pressures from under 100 pounds to over 6,000 pounds can be handled by standard Mallory holders and electrodes . . . available from stock. The new Mallory "Nu-Twist"* holders and electrodes will perform in the high pressure ranges needed for welds to meet all present military specifications . . . as well as the most demanding commercial requirements.

Because holders and electrodes are available in a wide variety of shapes and sizes, standard units can be combined to handle practically any resistance welding job without the cost or delay of special designs.

Like to see our complete line? Then write to us, or have your Mallory distributor drop by with a copy of Catalog 550C. See for yourself the complete range of holders, electrodes and accessories that are on the shelf for immediate delivery.



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Get more from MALLORY

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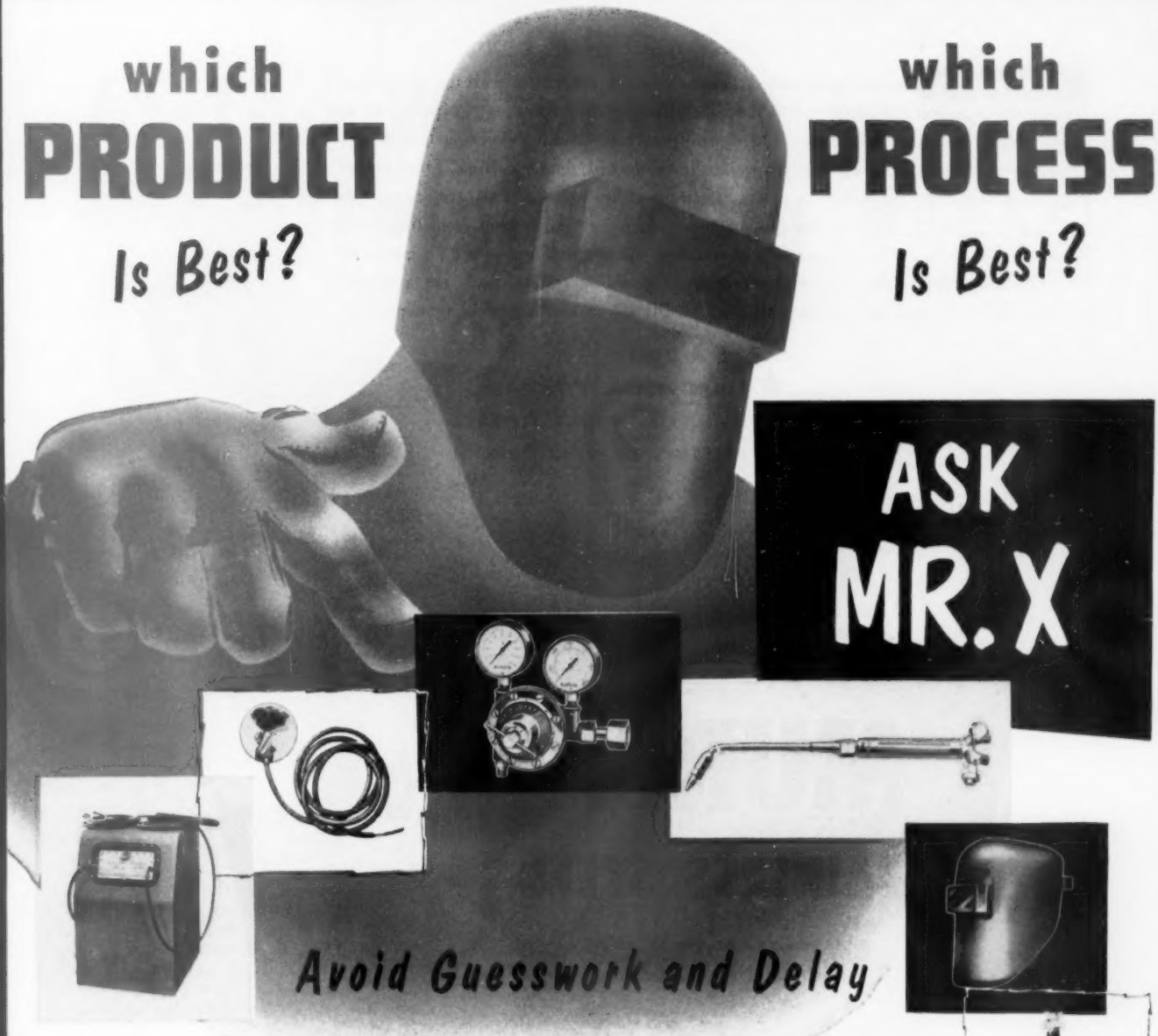
For information on titanium developments, contact Mallory-Sharon Titanium Corp., Niles, Ohio

which PRODUCT Is Best?

which PROCESS Is Best?



Mr. "X" is not one individual—rather he represents the collective experience and "know-how" of Burdox welding men. This "know-how" is the result of years of working in close harmony with companies having all types of welding problems — using all types of equipment on all types of jobs. Mr. "X" is not partial to any particular welding process . . . he is an expert in all of them and therefore in a position to suggest the best possible products for your particular needs.

When you buy Burdox you not only get the finest welding and cutting equipment that money can buy, but you engage the services of our Mr. "X". He will work with your workers . . . increase your output and stretch your welding dollar!

Get acquainted with the complete Burdox line — write for FREE catalog.

BUY BURDOX top quality industrial gases

BUY BURDOX gas welding and cutting equipment

BUY BURDOX arc welding equipment

BUY BURDOX safety equipment

BURDOX

Provides every product...every process... to fit every purpose best

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BRANCHES
AKRON CINCINNATI
COLUMBUS MANSFIELD

PLANTS
CLEVELAND, DAYTON & YOUNGSTOWN, OHIO
LOS ANGELES, CALIFORNIA

NOW M&T's hermetically sealed tin cans give you permanently all the advantages of MUREX Stainless Steel Electrodes. Moisture pick-up is eliminated — electrodes can be stored indefinitely without deterioration — shipping and handling damage, too, is prevented by packaging in six-container, specifically reinforced, double-cartons. *Inner* carton grips each container separately — *outer* carton furnishes extra overall protection. Get high quality MUREX Stainless Rods — in packages engineered to keep them that way! Remember, no matter what composition of stainless you are welding — M&T's extensive MUREX line provides the particular electrode to give best results. Rods are available in three different coatings — lime, titania, AC-DC — to suit the welding condition.

★ STOPS MOISTURE PICK-UP
★ PERMITS INDEFINITE STORAGE
★ PREVENTS SHIPPING DAMAGE

Smaller diameter rods furnished in 5-lb cans. Larger diameter in 10-lb cans.

NOW IN HERMETICALLY SEALED TIN CANS

MUREX®

STAINLESS STEEL ELECTRODES

Check into your stainless needs now — then get full details from your nearest M & T representative or dealer.

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ARC WELDING—Materials and Equipment
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61-Ton Weldment Is Bed for Straightening Press

Resembling a huge girder for a monumental bridge, this giant weldment is the bed for a 1000-ton straightening press for the A. B. Farquhar Division of the Oliver Corporation. It is made from plate steel, and consists of three webs, spaced about 9 in. apart, welded to the top and bottom sections.

The webs are 1¾ in. thick, and for extra reinforcement are connected to each other by lengths of 4-in. pipe, spaced at regular intervals. The top and bottom sections of the bed are 4½ in. thick. The weldment, 3 ft, 7½ in. wide, 5 ft high, and 50 ft long, has a total weight of 122,122 lb.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

WELDMENTS

can give you these benefits . . .

Scores of manufacturers of machinery and machine parts are benefiting through these advantages of Bethlehem Weldments:

1. **ECONOMY.** Bethlehem Weldments eliminate excess weight, without any sacrifice in rigidity. And lighter weight frequently leads to a lower manufacturing cost for the finished product.

2. **VERSATILITY.** Bethlehem Weldments cover a wide range of sizes. What's more, they can serve either as simple parts, or as units of intricate assemblies.

3. **FREEDOM OF DESIGN.** There is hardly any limit to the design possibilities of these weldments, as the steel from which they are made can be bent, pressed or shaped prior to welding, without harm to its physical structure.

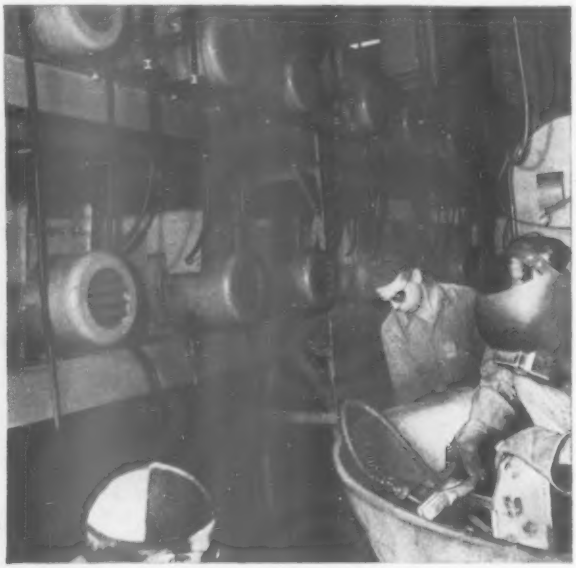
4. **FREEDOM OF USE.** Bethlehem Weldments are often used alone. And just as often, they are used effectively in combination with forgings or castings.

The nearest Bethlehem office will be pleased to discuss weldments with you. Get in touch with us at any time.

BETHLEHEM WELDMENTS

Welding Arcs

PROPER CURRENT SETTING is easy with G-E single-dial dual control. Button for magnetic starter is at far end of set.



REDUCED NOISE, INCREASED PROTECTION provided by new WD-40 sets are important factors in multiple-welder areas.

New Magnetic Starter, Quieter Fan Improve G-E Welder Performance

You receive important new benefits from today's General Electric Type WD-40 arc welders. First, you get improved welder and electrical-system protection and lower maintenance with the new magnetic starter. Second, you get reduced operator fatigue, resulting in higher production, because of the new, quieter ventilating fan.

These improvements, plus present G-E features, combine to give you this unexcelled performance:

- **STEADY ARC,** providing high penetration and minimum popouts due to a unique generator interactor which smooths out current fluctuations.
- **QUICK RESPONSE, GOOD CONTROL,** for vertical and overhead welding without special adjustments.
- **ACCURATE CURRENT SETTING** for every job due to the wide current range and jumbo-size selector dial.
- **LOW OPERATING COSTS,** the result of high-efficiency design and high power-factor operation.
- **MAINTENANCE SAVINGS,** because of long-life construction and provision for easy inspection.

G-E WD-40 welders are built in ratings of 200, 300, and 400 amps, for every direct-current industrial application. Your nearby G-E welding distributor can supply you with complete information. He's listed here and in the yellow pages of your phone book under "Welding Equipment—General Electric." Get in touch with him today. General Electric Company, Schenectady 5, N. Y. 710-3

You can put your confidence in—

GENERAL ELECTRIC

News

Information on equipment, electrodes and accessories from G.E., pioneer in arc welding

Neutralize moisture pick-up with a DryRod oven

If you are using low-hydrogen or stainless-steel electrodes, don't sacrifice their quality by using electrodes exposed to humidity. Moisture picked up after the package is opened can cost you much of the built-in protection against under-bead cracking and porosity. The answer to this problem is a DryRod oven.

Installed at the job, this oven restores electrode efficiency and provides a convenient, dry storage place. For you this means fewer rejects and reworks, less X-ray porosity.

The DryRod Type 300 oven holds 350 pounds of 18 in. electrodes, has a temperature range of 175 to 550 degrees, yet weighs only 115 lb. See your nearby General Electric welding distributor for more details.

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Joe Magee says . . . Try W-29 rod for high-impact jobs

When welding on farm implements, road-building tools, and other equipment subjected to high impact, use G-E Type W-29 electrodes.

These Class E-6012 electrodes combine the smooth welding and minimum spatter of G-E Type W-28 electrodes with higher elongation and impact values than generally found in E-6012 deposits. It's also easier to produce more-complex fillets with W-29, for greater resistance to weld-bead cracking. And W-29's high burn-off rate means faster production.

Exceptional impact strength of W-29 deposits makes these electrodes particularly applicable for work subjected to low temperatures.

So remember, next time you have a high-impact or low-temperature application, use the electrode especially designed for the job: G-E Type W-29.

Free Electrode Book

Here's a handy reference book that you will find use for again and again on the job. It's General Electric's pocket electrode catalog which contains concise descriptive and application information on all G-E electrodes.

This useful booklet is available *only* through your General Electric welding distributor. Ask him for your free copy of GED-1634 today.

Here's the name of your G-E Welding Distributor—

Alabama: Birmingham—Alabama Oxygen, Young & Vann Supply; Mobile—Turner Supply

Arizona: Phoenix—Consolidated Welding Supply

California: Fresno, Los Angeles, Oakland, Sacramento, San Diego, San Francisco, Ventura—Victor Equipment

Colorado: Boulder, Colorado Springs, Denver, Durango, Ft. Collins, Ft. Morgan, Greeley, LaJunta, Longmont, Pueblo—Hendrie & Bolthoff

Florida: Hollywood, Miami—Florida Gas & Chemical

Georgia: Atlanta, Macon—Welding Supply & Service; Augusta—Marks Oxygen; Columbus—Williams Welding Supplies

Idaho: Boise—Olson Manufacturing

Illinois: Chicago, Moline, Morton—Machinery & Welder

Indiana: Evansville—Drill Master Supply; Ft. Wayne, Indianapolis—Sutton-Garten; South Bend—Perry Welding Sales & Service

Iowa: Des Moines—Machinery & Welder

Kansas: Coffeyville—Thompson Bros. Supply & Welding Equip.; Hutchinson—Kopper Supply

Kentucky: Louisville—Reliable Welding; Paducah—Henry A. Petter Supply

Louisiana: Alexandria, Shreveport—Hughes Oxygen; New Iberia—Welders Supply; New Orleans—Equitable Equipment; Opelousas—Daigle Welding Supply, Lake Charles—Welders Equip.

Maryland: Baltimore—Arcway Equipment

Massachusetts: Boston—New England G-E Welding Sales Division

Michigan: Detroit—Welding Sales & Engineering; Grand Rapids—Miller Welding Supply

Minnesota: Duluth—W.P.&R.S. Mars; St. Paul—Production Materials

Mississippi: Jackson—Jackson Welding & Supply

Missouri: Kansas City—Hohenschild Welders Supply; St. Louis—Machinery & Welder

Montana: Billings—Valley Welders Supply; Butte, Great Falls—Montana Hardware

Nebraska: Lincoln—Lincoln Welding & Supply; Omaha—Baum Iron

New Jersey: Kenilworth—Welding Sales

New Mexico: Albuquerque—Industrial Supply Co., Hobbs—Western Oxygen; Las Cruces, Silver City—Car Parts Depot, Inc.

New York: Buffalo—Welding Equipment Sales; Syracuse—Welding Engineering & Equip.

North Carolina: Charlotte—Dixie Gases, Gastonia—Gastonia Motor Parts

North Dakota: Bismarck, Fargo—Acme Welding Supply; Fargo—Dakota Electric Supply

Ohio: Akron, Cincinnati, Cleveland, Columbus, Dayton, Mansfield—Burdett Oxygen; Toledo—Odland Iron Works

Oklahoma: Tulsa—G-E Welding Sales Division

Oregon: Eugene, Portland—J. E. Haseltine

Pennsylvania: Philadelphia, Pittsburgh—Arcway Equipment

South Carolina: Columbia, Greenville—Welding Gas Products

South Dakota: Deadwood—Hendrie & Bolthoff

Tennessee: Chattanooga, Knoxville, Nashville—Welding Gas Products; Memphis—Delta Oxygen

Texas: Abilene—M&M Welding Supply; Alice, Corpus Christi—Crane Welding Supply; Alpine, El Paso, Marfa, Pecos—Car Parts Depot; Amarillo—Tex-Air Gas; Brownsville, Harlingen—Acetylene Oxygen; Dallas—Hill Equipment & Supply; Houston—G-E Welding Sales Division; Lubbock—Welders Supply of Lubbock; Midland—West Texas Welders Supply; Odessa, Pecos—Western Oxygen; Plainview—Plains Welding Supply; San Angelo—Southwestern Welding Supply; Snyder—Western Welding Supply; Texarkana—Hughes Oxygen; Wichita Falls—Hortex Welding Supply

Utah: Salt Lake City—The Galigher Co.

Washington: Seattle, Spokane—J. E. Haseltine

West Virginia: Bluefield—Bluefield Supply; Charleston—Virginian Electric, Huntington, Logan—Logan-Hardware & Supply

Wisconsin: Milwaukee—Machinery & Welder

Alaska: Anchorage—Northern Supply

Canada: Toronto—Canadian G.E.

Hawaii: Honolulu—American Factors, Ltd.

WORTHINGTON WELDING POSITIONER ELIMINATES time-wasting handling of the work-piece . . . increases arc-time by tilting the work into position for continuous, economical downhand welding. Capacities from 100 lbs to 30 tons. Also: Turning Rolls from 3 to 150 tons, stationary and self-propelled.

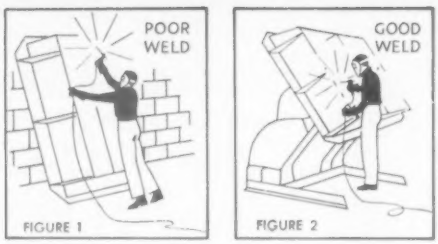
A way to get more and better welding from your welders

Every minute your welders spend climbing, turning and propping is *lost* welding time.

Turn this waste time into *all arc-time* with Worthington Welding Positioners that tilt or turn all welds into position—*without delay*—for *continuous* downhand automatic or manual welding. Today's labor scarcity makes this increased production more important than ever.

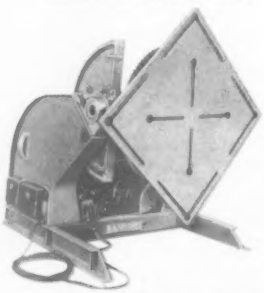
These Positioners lower costs and boost production up to 50%. Downhand welding is *quicker* (only one pass instead of two or three) . . . *better* (deeper penetration with higher current, heavier electrodes, faster deposition of weld metal) . . . *neater* (weld metal levels itself). There's less rod waste, too.

Where can you see a Worthington Welding Positioner at work near you? Just write Worthington Corporation, Plainfield, N. J., for this information or for Bulletin 210D.



HOW WORTHINGTON WELDING POSITIONERS PRODUCE BETTER WELDS

When the welder has to climb over, prop or flop the work-piece, he may only be able to use downhand welding over a limited area (Figure 1). With a Worthington Welding Positioner, the work is continually tilted or rotated automatically into position for downhand welding (Figure 2).

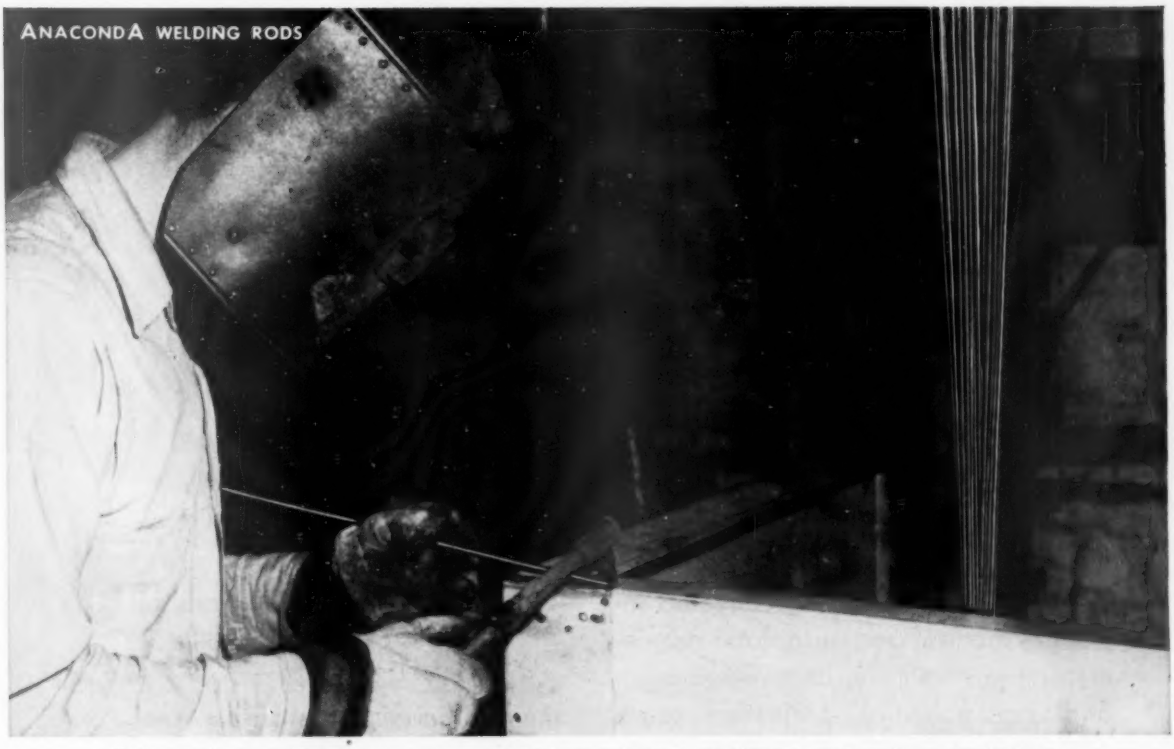


WORTHINGTON'S UNIVERSAL TABLE TOP makes the Welding Positioner as profitable on job work as mass production. Those "T" slots make the table adaptable to any shape of work-piece and a wide range of sizes. No special jigs or fixtures needed.

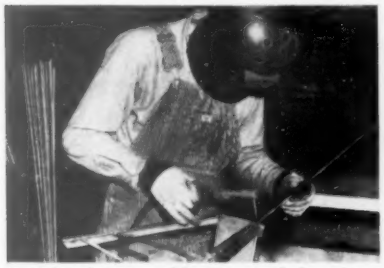
Y.2.3

WORTHINGTON

Welding Positioners
Turning Rolls

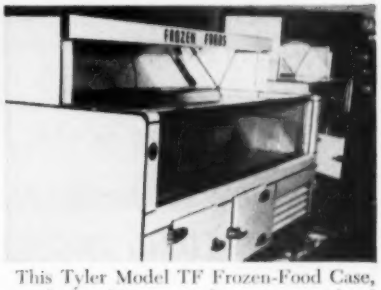


Carbon-arc braze welding of a corner seam with ⅛ in. Everdur Rod on Tyler Fixture Corp. frozen-food cabinet.



Everdur braze welds are used for this meat case scale shelf. The easy-finishing characteristics of joints made with this copper-silicon alloy rod keep costs down.

Close-up of Everdur braze welds on corner seams. Smoothness of the Everdur filler metal is produced by low-melting temperature, free-flowing characteristics.



This Tyler Model TF Frozen-Food Case, ready for shipment, is but one example of how braze-welding with ANACONDA Rods cuts production costs and speeds assembly.

Everdur Rod speeds cabinet production with distortion-free braze welds

Braze welding is an important production operation on these steel frozen-food cases made by The Tyler Fixture Corporation at their Waxahachie, Texas, plant. A total of 8 corner welds, each approximately 3 inches long, is involved.

These braze welds on .0418-in. steel sheet are made with Everdur* Rod, using a carbon-arc without flux—a combination of rod and method that produces a fast and low-cost joint without structural distortions.

The reason Everdur Rod makes these braze welds fast and economically for Tyler—as it is doing for manufacturers everywhere—is the low-temperature-melting and free-flowing characteristics of this copper-silicon alloy rod. It produces a smooth seam that's easy to finish, can't rust and that is dependably strong and uniform.

This is a typical story of Everdur Welding Rod's ability to speed assembly and keep down costs on production operations. The ANACONDA Welding Rod Distributor in your area can tell you the complete story on Everdur and other ANACONDA Copper Alloy Welding Rods. Ask him, or write for your copy of Publication B-13. *The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.* *Reg. U. S. Pat. Off. 5160

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ELECTRODE COMPARISON CHART FOR STAINLESS STEEL ELECTRODES

Lists AISI Stainless Electrode Type Number, the ASTM-AWS Specification Number and the manufacturers' corresponding electrode numbers. 22 manufacturers are listed—the most complete chart of its type available. Chart measures 9½" wide and 11" deep, folded, and 27" wide and 11" deep when opened.

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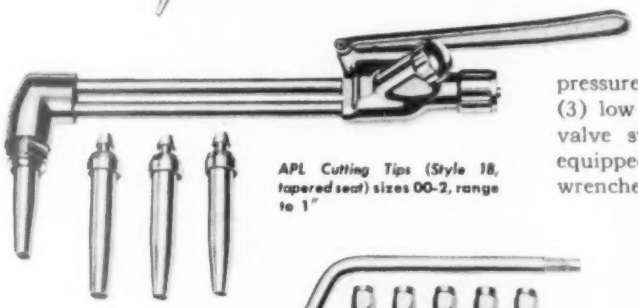
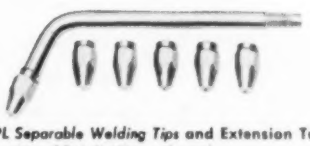
APL Swaged Welding Tips sizes 00-5 (long cone flame). Range, lightest gauge to ¼" plate.

APL WELDING TORCH. Weight with largest tip 6¼ oz., length 10¼". Handle fluted brass, forged head and rear end. Joints silver soldered. Needle valves positioned for easy adjustment. Stainless steel valve stems, Teflon packing rings assure fine flame control, easy operation and high efficiency. Universal mixer with Neoprene seal rings assures leak-proof seal when hand tightened.

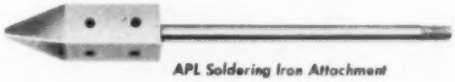


APL Cutting Tips (Style 18, tapered seat) sizes 00-2, range to 1"

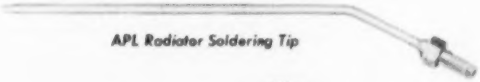
APL CUTTING ATTACHMENT (Style 564). Weight (with tip) attached to handle 14 oz., length 12⅜". Silicon bronze forged head, 90° Forged brass body houses (1) high pressure assembly equipped with "O" ring (2) mixer (3) low pressure oxygen valve with stainless steel valve stem and Teflon packing. Cone connector equipped with seal rings assures leak-proof joint. No wrenches required.



APL Separable Welding Tips and Extension Tube. Tip sizes 00-4 (bulbous flame).



APL Soldering Iron Attachment



APL Radiator Soldering Tip

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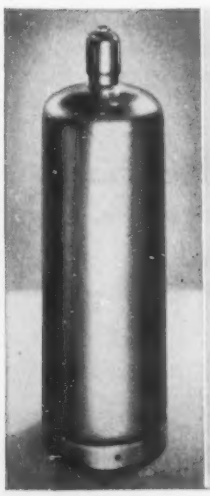

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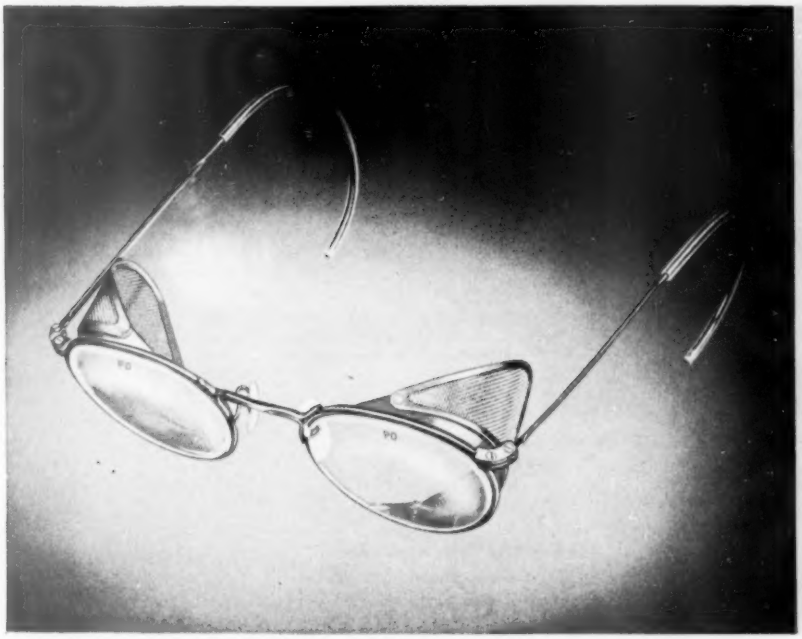

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Pure copper tips withstand heat and wear. Swaged passages, streamlined flow, precision ports for maximum flame stability.

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Ball in sealing end of stem keeps valve gas-tight. Closing valve tightly repairs a scored seat.

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Seamless brass internal tubes rigidly anchored to withstand hard use. Coiled oxygen tube suppresses flashbacks.

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High-strength, wear-resistant bronze; protected seating surfaces.

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Easily replaceable "O" rings of long-lived synthetic rubber eliminate critical metal-to-metal gas seals.

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Welding heads snap in and out of blowpipe, seal gas-tight with one easy motion, lock in any working position.

TELLTALE MIXERS

Disk-type mixer in each head resists flame pops and backfires, eliminates burnouts. Number marked on mixer designates both head size and hourly gas flow.

The new W-202 PUROX Blowpipe easily welds anything from lightest sheet to heaviest plate or casting. Although built for rough use, it is lightweight, easy to handle, and well balanced in any working position. Overlapping welding ranges of its 13 head sizes (2 to 100 cu. ft. per hr. capacity) permit choice of hard or soft flame for any metal thickness.

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When you buy MILLER welding equipment, you may be sure your MILLER Welder is the latest of its type . . . whether it be A.C. or D.C. MILLER Welders are not only the most efficient welders of their type, but ahead of others in their modern improvements. . . MILLER Selenium Rectifier Type D.C. Welders are the greatest advancement in arc welding in the past 25 years . . . welders that will lay down a higher quality bead of weld metal than any other D.C. welder known today.

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The Sureweld Portable Gas-Driven D-C Arc Welder is truly an amazing welder. Amazing because it is so small and light and portable. Amazing because it can get in where other welders cannot go. Amazing because you can do far more jobs *faster* with it than any other welder of its capacity.

One man can move it. Two men can lift it. Any auto, truck or station wagon can stow it. On the job it produces welding power at once and it handles 85-90% of all on-the-job welding. Most amazing of all, it saves so much, it repays its cost several times a year.

On multi-story building the Sureweld Portable moves easily from floor to floor with the operator—always within standard cable length of the work. No extra cable to buy. No power wasted because of excessive cable length. No hoisting of heavy cable from floor to floor.

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Branches and Dealers from Coast to Coast

NCG®

EVERYTHING FOR WELDING

Copyright 1953, National Cylinder Gas Company

NATIONAL CYLINDER GAS COMPANY E

840 N. Michigan Ave. · Chicago 11, Ill.

☐ Please rush Illustrated Bulletin NH-121 containing full details of the SUREWELD Gas-Driven D-C Arc Welder.

☐ You may arrange, at no obligation to me, a demonstration of the Sureweld.

NAME_____ POSITION_____

FIRM_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

HAND PROTECTION

"Here's a swell welder's glove, Joe!"

Yes, it's

AO HEAVY DUTY HORSEHIDE

Best for Flexibility, Heat Resistance, Wear

"Shake hands" with AO's "super" line of hand protection for welders. Each glove and mitten is 14" long . . . has a smooth finish . . . improved heavy weight soft lining on back for greater protection . . . quality edges bound with tape and stitched. These are features which make this chrome-tanned *horsehide* line better than ever. Test them on the job. *See* the difference! *Feel* the difference! Your nearest AO Safety Products Representative can supply you.

TX100 Gunn cut—one piece back. Double thickness of leather on first finger and thumb, also on portion of palm. Lined on back from wrist to finger-tips.

5X163 Gives exceptional resistance to heat on gas welding and heaviest amperage electric welding. One-piece back and palm. Welted at all vulnerable seams. Extra heavy lining on back of hand.

TX200 Gunn style. Standard size (11) also sizes 10, 12. Welted seam at base of palm and wrist. One-piece back. Wing thumb.

6X141 One-piece back and palm. Crotch of thumb reinforced with wide leather strap. All vulnerable seams welted for extra protection. Back of hand is lined.

Also ask to see and *feel* the other six gloves and mittens in this top quality AO line.

American Optical COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

AMSCO V-MANG

The new moly-manganese electrode that's better than nickel-manganese rods for build-up and repair

Comparison of yield and tensile strength

For full engineering and metallurgical information on Amsco V-Mang, write for technical data sheet to Amsco, Chicago Heights, Illinois.

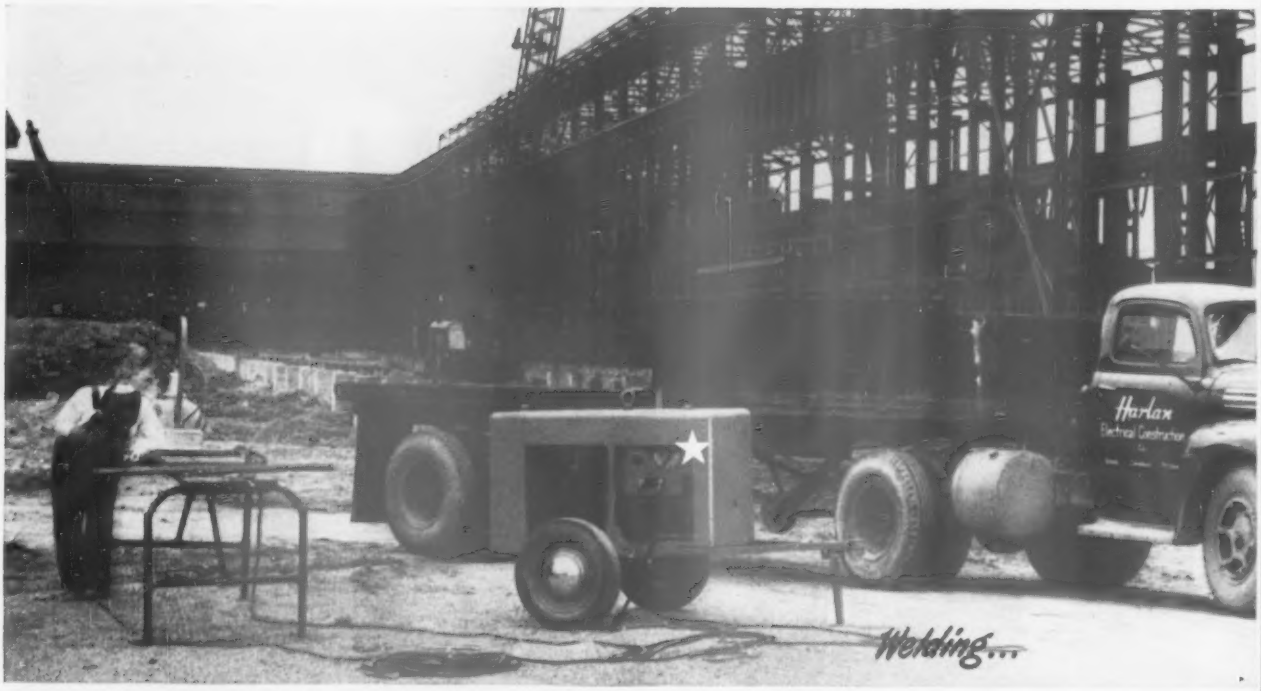
- TOUGHER DEPOSIT
- BETTER WELDABILITY
- HIGHER YIELD STRENGTH
- LESS CRACKING

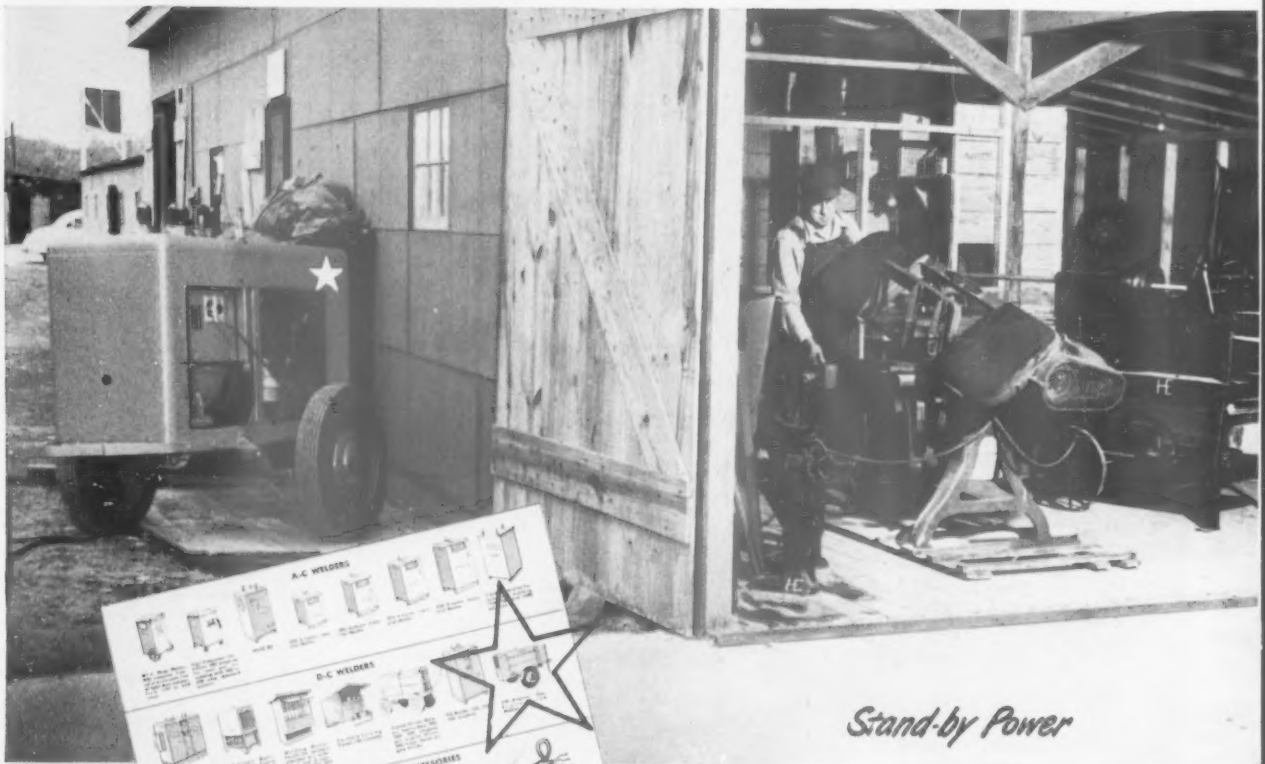
AMSCOATING
THE RIGHT WAY TO SAY HARDFACING

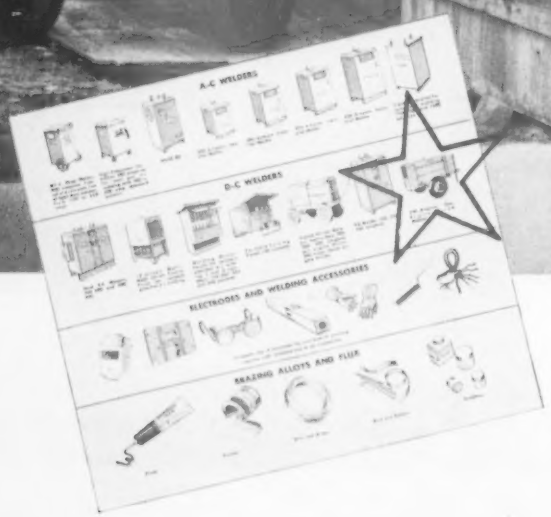
AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
382 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que.







EVERYTHING
for Welding ANYTHING!

Another Westinghouse Engine-Driven Welder pays off . . . This time for Harlan Electric Company

The new Westinghouse Engine-Driven Welder has paid off for still another production-minded contractor . . . Harlan Electric Construction Company of Toledo. This progressive company utilized its combination of welding and stand-by power this way:

They moved it around to do hundreds of vital jobs including the welding of brackets for feeders, transformers and load centers. A cable, from the a-c power take-off, on the unit, supplied electricity for a nearby storeroom and field shop. The stand-by power was used for electric lights, power saw, drill, and pipe threading machine. This double-duty operation saved Harlan Electric Construction Company time and extra equipment, while handling tough field construction jobs easily and efficiently. Why not look into the benefits of this welder for your jobs? This two-way unit provides 200 amperes of d-c current for welding and 3000-watt, 110-volt a-c current for stand-by power. The standard unit is skid mounted for truck transport, or may be mounted on high-speed, pneumatic-tired trailer. Ready for field service, the machine weighs only 1150 pounds and measures 39½" high and 62⅝" long.

For fast courteous service call your nearest Westinghouse representative or write Westinghouse Electric Corporation, Welding Division, P. O. Box 868, Pittsburgh 30, Pa. For complete information on the full line of Westinghouse welding products, just send in the attached coupon. J-21798

YOU CAN BE SURE...IF IT'S Westinghouse

- ☐ B- 5838 Type EW-20 Engine-Driven Welder
- ☐ B-5451 Welding Accessories
- ☐ B-5452 General Purpose WT-Type A-C Welders
- ☐ B-5453 D.C Arc Welder Type RA
- ☐ B-5454 Brazing, Phos-Copper and Phos-Silver
- ☐ B-5622 Type HC Industrial A-C Welders

Westinghouse Electric Corporation, Welding Division
Box 868, Pittsburgh 30, Pennsylvania

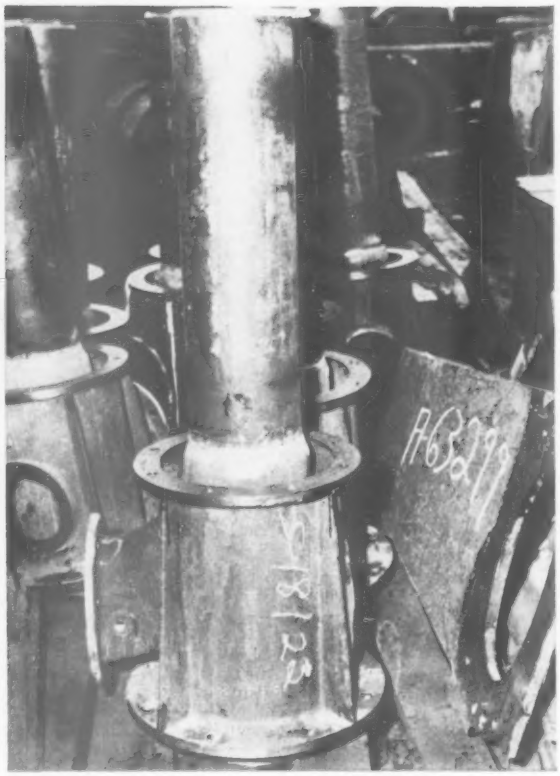
NAME _____

ADDRESS _____

CITY _____

STATE _____

HOW ...to weld Ductile Iron



This large diameter Hydrafuge gives all of the advantages of welded construction. A sound weld . . . in less time, with less trouble . . . means more production at less cost. It's done with Ni-Rod "55", the ideal electrode for welding Ductile Iron to steel pipe.

DUCTILE IRON is a new type iron . . . with greater toughness, higher tensile strength and better weldability.

The commercial types (with tensile strengths ranging between 65,000 and 105,000 psi) can be readily welded to each other or to dissimilar metals such as carbon steel or alloy steels.

How? With Ni-Rod "55"® . . . the recommended electrode for any Ductile Iron welding job.

And for the best weld here's the procedure: clean off all oil, grease and dirt. Grind off "skin." Bevel edges. Pre-heat to about 600° F. when pressure-tight joint is required. Weld with lowest possible current that gives smooth operation.

For welding in flat position, 3/32" electrodes take 60-70 amps, 1/8" take 90-100 amps, 5/32" take 120-130 amps, 3/16" take 140-150 amps. Lower currents for out-of-position welding.

Heating should not be concentrated in one area. Use intermittent bead method to heat evenly. Peen gently with a round-nosed tool. Then cool off weld area slowly by covering with asbestos or other insulating material.

A sound weld? Yes . . . just as sound as the Ni-Rod "55" weld on the Hydrafuge Casting shown above. In this case the ability of Ni-Rod "55" to produce a solid joint between Ductile Iron and carbon steel made available all of the advantages of welded construction.

Do Ni-Rod "55"'s weldability and Ductile Iron's engineering properties offer an opportunity to improve production (or repair, or salvage) in your plant? Then write for your copy of Inco's new folder Ni-Rod "55".

By the way, if you're at the AWS Welding Show at the Shamrock Hotel, Houston, June 16-19, drop in at our booth, (73-78).

Consult your distributor of Ni-Rod "55" electrodes for the latest information on availabilities and assistance with special welding problems. Remember, too—it always helps to anticipate your requirements well in advance due to today's defense demands for nickel.

INCO NI-ROD TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street, New York 5, N. Y.

your next move - - - determines tomorrow's Market Position!

• • • Welding equipment, tools and supplies have, for the most part been *bought* rather than *sold* for the past several years. Now many companies are facing a very noticeable shift to a buyers' market.

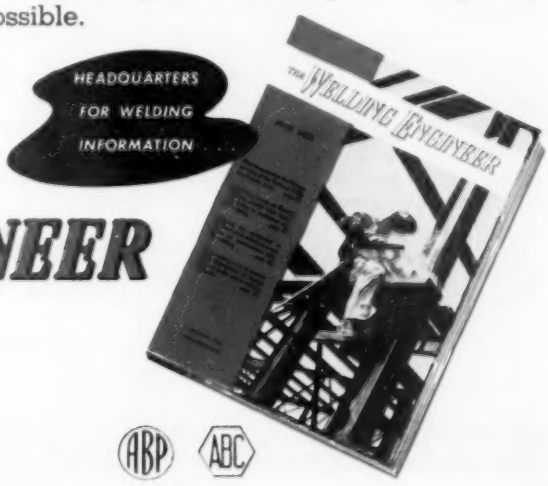
Competition is a lot keener and manufacturers *must* set their sights on long-range sales and distribution planning. All such planning must be done with accurate knowledge of where the market exists and how best it can be reached and exploited.

THE WELDING ENGINEER is the headquarters for welding market information. It is the one and only magazine that maintains a continuing program of market research, product studies and end use surveys. Therefore, manufacturers of welding products can have, at their fingertips, accurate information in order to plan today for tomorrow's markets.

Here is some of the material available.

- • Markets for Welding Products
- • Welding in the Metal Markets
- • Fabricated Metal Products Survey
- • Contract Weld Shop Survey
- • Buying Habit Study
- • Stainless Steels
- • 1952 Welding Facts and Figures (Ready in June)
- • Welding Fittings Study
- • List of Welding Distributors

Plan now for tomorrow's market. Your nearest WELDING ENGINEER representative will be glad to assist you in any way possible.



THE WELDING ENGINEER

330 WEST 42nd STREET

New York 36, N. Y.

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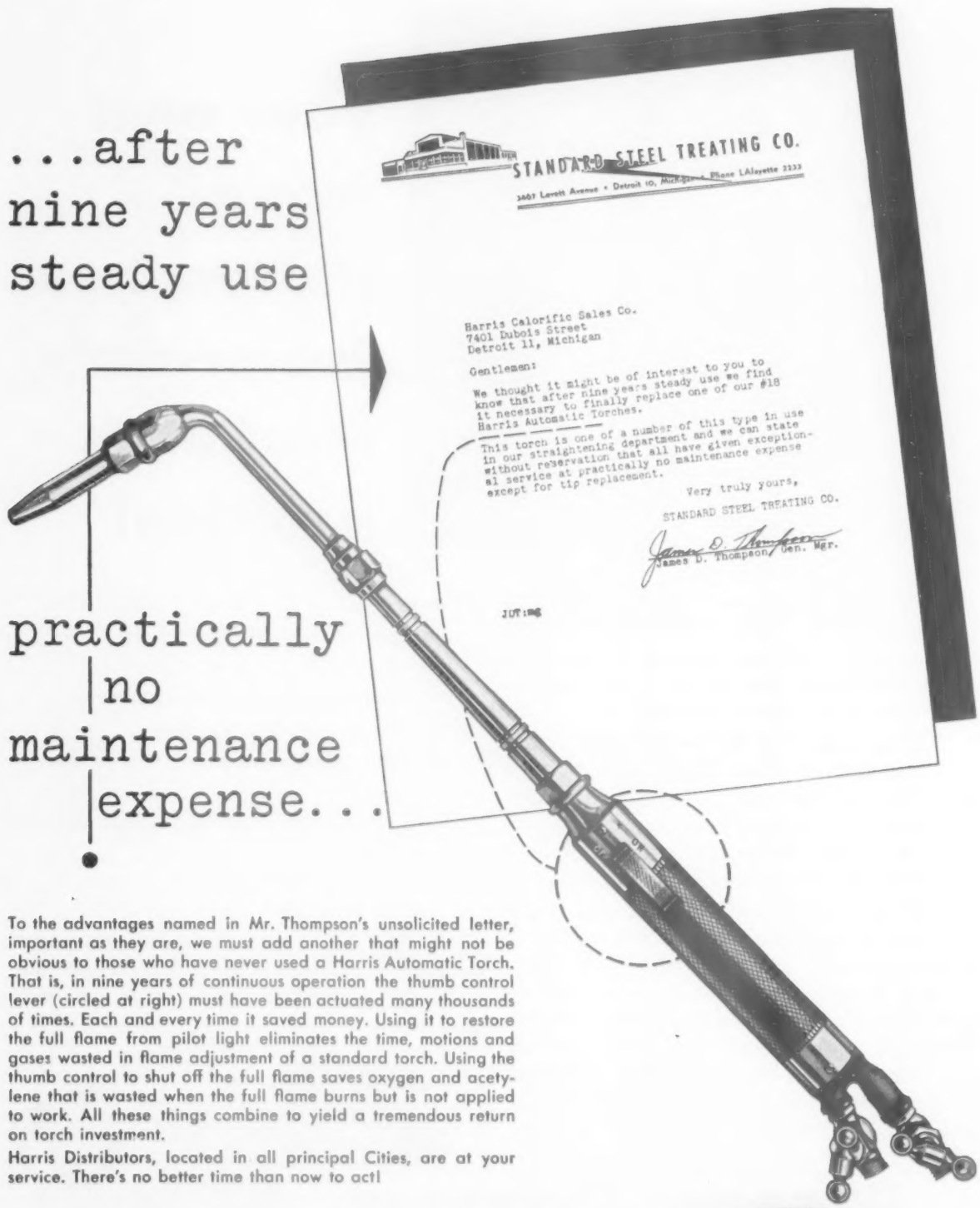
ABP ABC

...after
nine years
steady use

practically
no
maintenance
expense...


STANDARD STEEL TREATING CO.
2687 Lavett Avenue • Detroit 10, Michigan • Phone LAfayette 2333
Harris Calorific Sales Co.
7401 Dubois Street
Detroit 11, Michigan
Gentlemen:
We thought it might be of interest to you to know that after nine years steady use we find it necessary to finally replace one of our #18 Harris Automatic Torches.
This torch is one of a number of this type in use in our straightening department and we can state without reservation that all have given exceptional service at practically no maintenance expense except for tip replacement.
Very truly yours,
STANDARD STEEL TREATING CO.
James D. Thompson, Gen. Mgr.
JDT:MS

To the advantages named in Mr. Thompson's unsolicited letter, important as they are, we must add another that might not be obvious to those who have never used a Harris Automatic Torch. That is, in nine years of continuous operation the thumb control lever (circled at right) must have been actuated many thousands of times. Each and every time it saved money. Using it to restore the full flame from pilot light eliminates the time, motions and gases wasted in flame adjustment of a standard torch. Using the thumb control to shut off the full flame saves oxygen and acetylene that is wasted when the full flame burns but is not applied to work. All these things combine to yield a tremendous return on torch investment.

Harris Distributors, located in all principal Cities, are at your service. There's no better time than now to act!

THE HARRIS CALORIFIC COMPANY

Cleveland 2, Ohio

HARRIS

SERVING THE METAL INDUSTRY SINCE 1905

WORTH WAITING FOR!

WELD-ARC LOW HYDROGEN ELECTRODES

For Welding with AC-DC in All Positions

WELD-ARC TYPES	TYPICAL WELD DEPOSIT ANALYSIS
7016	.70% Mn
7016 N	1.0% Ni
8016 N	3.30% Ni
9016 CM	1.0% Cr—.50% Mo
9016 MM	1.70% Mn—.40% Mo
9016 NCM	1.35% Ni—.55% Cr—1.40% Mn
10016 NM	1.70% Ni—1.35% Mn
10016 CM	2.40% Cr—.50% Mo
12016 NMV	1.75% Ni—1.25% Mn—.25% V

A FULL AND COMPLETE LINE OF NINE DIFFERENT LOW HYDROGEN ELECTRODES

HERMETICALLY SEALED in 10 lb. moisture-, dirt-, grease- and dust-proof all-metal containers immediately upon emerging from the baking oven.

SECURELY PACKED in oven-fresh condition, with 6 containers carefully cushioned from each other by inner carton; then placed in a sturdy outer carton to prevent possibility of any damage en route to you.

Send for your free copy of

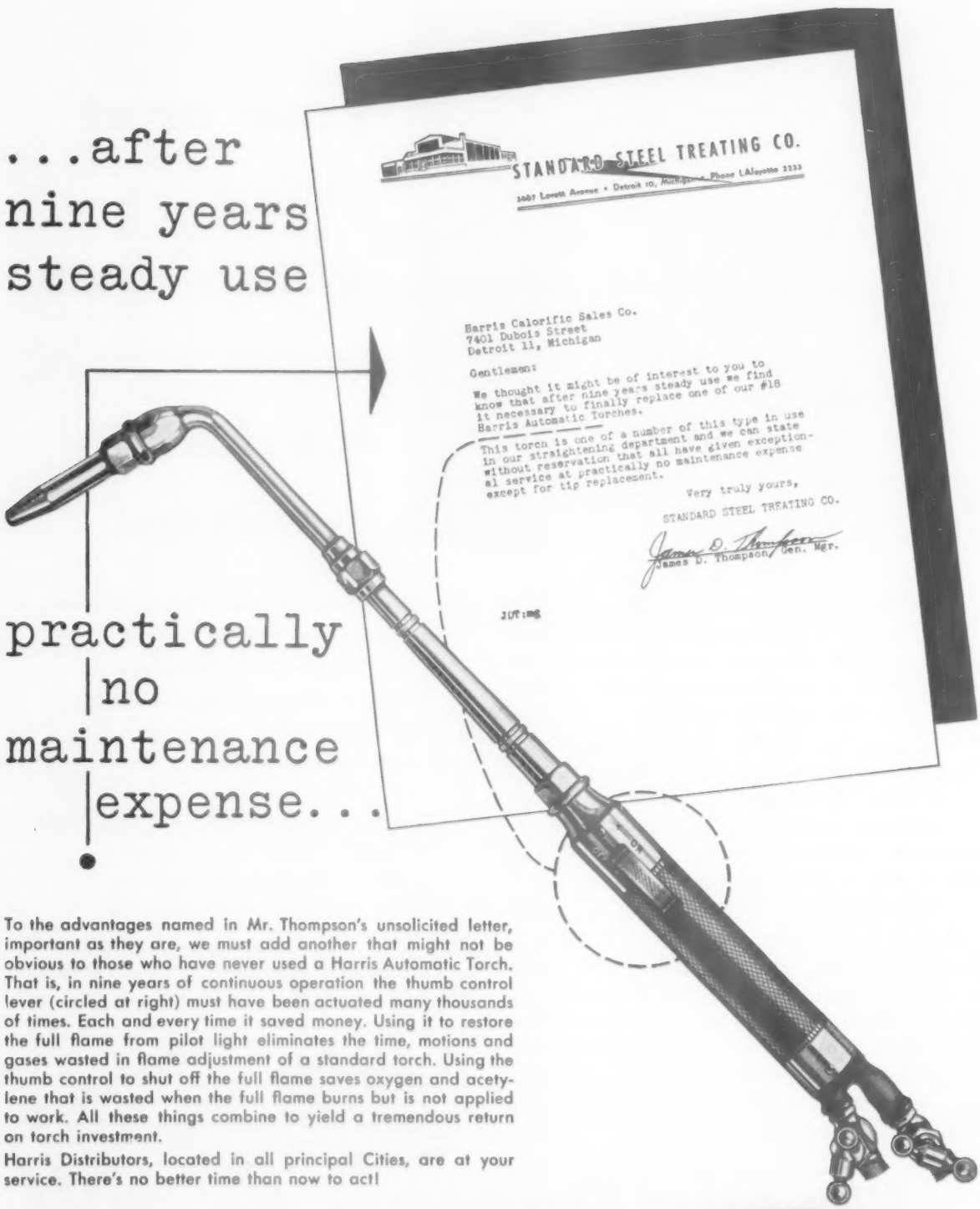
THE FACTS ABOUT LOW HYDROGEN ELECTRODES

ALLOY RODS COMPANY
YORK, PENNSYLVANIA

NO FINER ELECTRODES MADE... ANYWHERE

SOUTHWESTERN PREMIERE • ALLOY RODS 22-MINUTE COLOR AND SOUND MOTION PICTURE "NO FINER ELECTRODES MADE . . . ANYWHERE" . . . SPACE 120-121, WELDING & ALLIED INDUSTRY EXPOSITION, HOTEL SHAMROCK, HOUSTON, JUNE 16-19.

...after nine years steady use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OFF
ON

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HARRIS

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HERMETICALLY SEALED in 10 lb. moisture-, dirt-, grease- and dust-proof all-metal containers immediately upon emerging from the baking oven.

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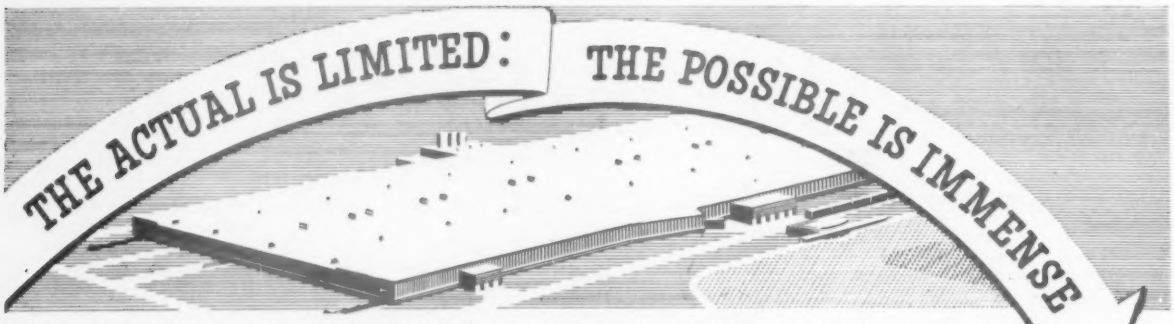
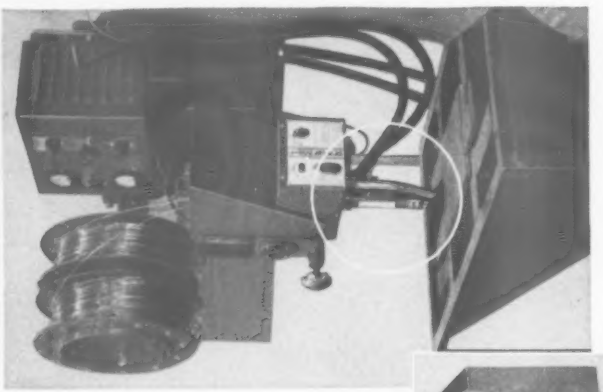


NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

© LE Co. 1953

"TWINARC'S" FASTER, LOWER COST WELDING BOOSTS SHOP EFFICIENCY



IT is now possible to realize savings up to 35% in the cost of automatic welding with Lincoln's new "TWINARC". Welds have deeper penetration, greater uniformity . . . and are produced at *speeds 50% higher* than possible with single electrode automatic welding.

Reports from code welding fabricators indicate quality superior to conventional automatic processes.

With "TWINARC", welding currents up to 1200 amps are concentrated on two small diameter electrodes (Fig. 1). These electrodes can be set in line with the work for tandem welding to attain maximum penetration at high speed. For welding thin material or assemblies with poor fitup the "TWINARC" head may be rotated in any position to 90 degrees across the joint to spread the arc, reducing the danger of burning through.

"TWINARC" welding is only one of many new Lincoln developments designed to cut your costs. Have your representative survey your needs and recommend latest Lincoln techniques to speed welding, to simplify your operations and save money.

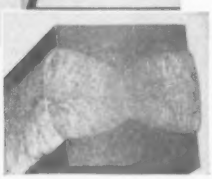


Fig. 2. Automatic Lincolnweld LAF-2 *with new "TWINARC" attachment. "TWINARC" replaces original single electrode jaws. Operates with same single controls. Inset shows butt weld in 1-½" plate with single pass on each side with "TWINARC". Welding speed is 38% faster than possible with single electrode.*

INCREASES WELDING SPEEDS 50% AND HIGHER! TO CUT YOUR COSTS

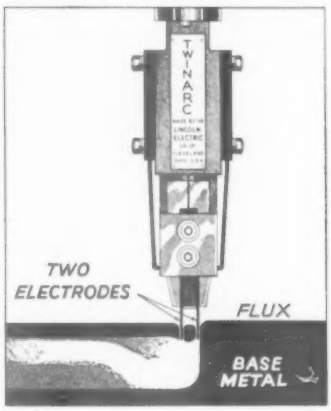


Fig. 1. New Lincoln "TWINARC"... *feeds two continuous electrodes simultaneously for faster, more efficient "hidden arc" welding in granular flux.*

Results... utilizes currents up to 1200 amps, produces deeper penetration, higher quality welds, at lower cost.

HANDLES A WIDER RANGE OF WORK

ANOTHER LINCOLN FIRST

GET THE FACTS — *Bulletin on "TWINARC" welding giving latest speeds and procedures is available by writing on your letterhead to Dept. 1705.*

THE LINCOLN ELECTRIC COMPANY

CLEVELAND 17, OHIO

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

ESTABLISHED 1916

THE WELDING ENGINEER

MAY, 1953

It Can Be a Good Year, but—

REMEMBER the old fable about the ant and the grasshopper? When times were good, the grasshopper fiddled and practiced the broad jump all day long while the ant sweated and toiled. When business fell off, however, the grasshopper shivered and starved, but the thrifty old ant was sitting pretty in comfortable winter quarters.

Right now we're living in the grasshopper's summertime. As I travel around the country, welding distributors tell me that this is the best month in the history of their businesses. Metal fabrication shops say that they are turning out more and bigger weldments than ever before. Yes, business is good now, but what are you doing to keep it that way?

Ever since World War II we have been enjoying what is termed a sellers' market. Muscles long disused will wither and become atrophied. How long is it since you have exercised your selling muscles?

If you are doing selling now—real selling—these words are not meant for you. But if you are just filling orders, maybe the time will come when you will have to go out and look for business. That will be the test that "separates the men from the boys," as the war saying goes.

All of this doesn't mean that you should start trembling over the prospect that business will go all to pot if, as and when the war in Korea ends, and the Eisenhower administration starts cutting down on the defense budget. The worriers and weak sisters will try to talk us into a depression, of course, but you need pay no attention to their sniveling. Most economists assure us that good times will be with us for at least another year regardless of how the picture changes nationally and internationally.

REALLY, there isn't any reason why your volume shouldn't hold up for years to come. But you will have to get on the selling ball if you mean to stay in business after the grasshopper's pleasant summer ends and the ant's long cold winter begins.

You've been selling, you say? Oh sure, but what? Have you sold anyone on the idea of doing a job by welding who wasn't already inclined that way? Have you converted any engineer, architect or designer who wasn't already sold? Have you just drifted down with the current, or have you rowed your boat upstream?

Have you promoted any new uses of welding in your community? Do you know if your local building code will permit welding? If it's negative, have you done anything about changing it? Even to the extent of writing a letter to your newspaper?

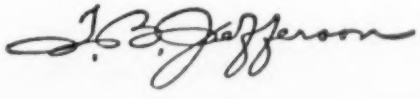
IN CITY halls and in state capitol buildings today, you will find key men who are yet to be sold on the economy, desirability and reliability of welding. Someone must take the trouble to impress upon them the fact that welding has now come of age. That the American Welding Society has more than 30 codes, standards and specifications to back up welded recommendations.

Every day bridges are being built that are not welded bridges. Every day buildings are going up that do not have welded frameworks. Yes, selling in the welding field means a lot more than taking orders from those who are already sold. Don't look backward upon the ground that we have already covered; look forward to fields we still have to sow.

Hold up your hand now and take the following pledge:

"Being of sound mind and earning a living from welding, I pledge that I will do all in my power to help the industry go forward. I will make a point of introducing welding to those who are now strangers to it. I will point out to manufacturers the advantages of stronger products, more pleasing appearance, lighter weight and dollar savings. I will help them to select the right welding processes and advise them on how to design products for production by welding. I will urge consulting engineers, building contractors and architects to look into the advantages of welded construction. I will help them to find information that bears upon their particular problems.

"Everywhere that I go, I will preach the advantages of welding. And it will not be necessary for me to hope that business will come to me. Because it will."



LET'S TALK ABOUT MONEY SAVING ZIRTUNG

AT THE

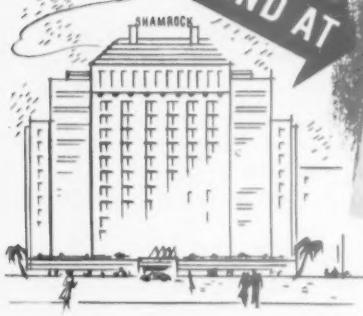
National Welding Supply Association Show

Sheraton-Gibson Hotel
Cincinnati, Ohio
May 11-12-13

AND AT

The Welding and Allied Industries Exposition

Shamrock Hotel, Houston, Texas
June 16-17-18-19
Booth No. 28



ZIRTUNG licks contamination problems

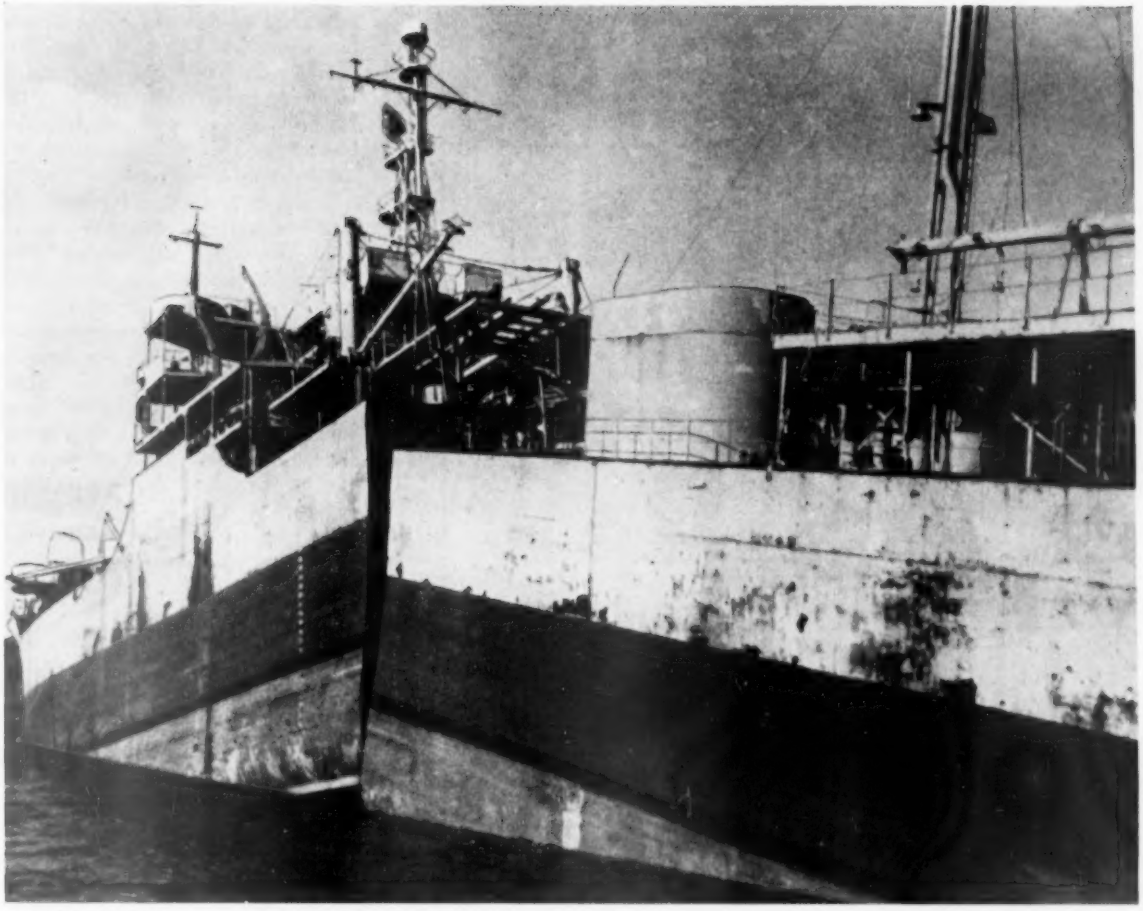
Zirtung, an exclusive Sylvania development, is the first electrode produced specifically for inert gas arc welding. It self cleans contamination without loss of electrode. Lasts longer . . . saves money in long runs. Wonderful for stainless and mild steels, aluminum, and magnesium.

For further information call your Sylvania Welding Distributor or write to: Sylvania Electric Products Inc., Dept. 3T-4305, 1740 Broadway, New York 19, N. Y.

SYLVANIA

LIGHTING · RADIO · ELECTRONICS · TELEVISION

In Canada: Sylvania Electric (Canada) Ltd., University Tower Building, St. Catherine St., Montreal, P. Q.



TANKER broke in two at dock. Position of the tanker's two parts indicates the bending load that caused the fracture

Why Some Welded Ships Fail*

The culprit isn't welding, but notch brittleness. Latest report from the Bureau of Standards throws light on the troublesome question of how fractures start.

FAILURES in welded ships are not many when compared with the number of welded ships that have been constructed. Nevertheless, such failures have cost our nation almost $50,000,000 in the past nine years, and there have also been costly failures in other welded steel structures such as bridges, storage tanks and pressure vessels.

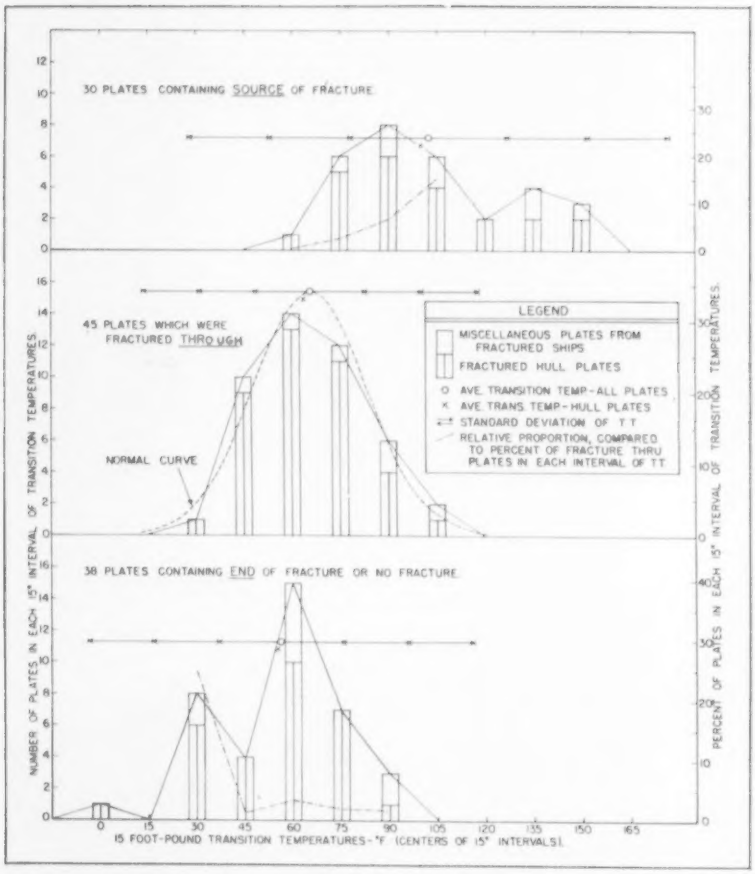
Fractures have also occurred in riveted ships and structures. However, these fractures usually ended at the first joint and did not propagate into adjoining plates. But a welded structure is continuous, and a crack may propagate across the welds from one plate to the next. Since welding has largely replaced riveting in ship construction, the problem of fracture origin and propagation has been given much attention during the past few years.

The Ship Structure Committee, successor to a board established by the Secretary of the Navy in April, 1943, to investigate the design and methods of construction of welded steel merchant vessels, has conducted extensive technical and statistical studies of the casualties and initiated research projects in several laboratories. The metallurgy division of the National Bureau of Standards was assigned to the investigation of the plates removed from the fractured ships. The metallurgy laboratory has received and examined samples from nearly 100 ships in which fractures occurred, and tests have been completed on 126 plates selected from 65 of these ships. The laboratory investigation included examination of the fracture and of welds, microscopic examination, chemical analyses of the plates, tensile tests and Charpy V-notched bar tests over a range of temperatures.

Three basic factors are involved in the prevention of failures of welded structures:

First, the steel plates and weld

*Abstract of technical report from National Bureau of Standards.


30 PLATES CONTAINING SOURCE OF FRACTURE
45 PLATES WHICH WERE FRACTURED THROUGH
NORMAL CURVE
38 PLATES CONTAINING END OF FRACTURE OR NO FRACTURE
LEGEND
MISCELLANEOUS PLATES FROM FRACTURED SHIPS
FRACTURED HULL PLATES
AVE. TRANSITION TEMP-ALL PLATES
AVE. TRANS. TEMP-HULL PLATES
STANDARD DEVIATION OF T.T.
RELATIVE PROPORTION, COMPARED TO PERCENT OF FRACTURE THRU PLATES IN EACH INTERVAL OF T.T.
NUMBER OF PLATES IN EACH 15° INTERVAL OF TRANSITION TEMPERATURES
PERCENT OF PLATES IN EACH 15° INTERVAL OF TRANSITION TEMPERATURES
15 FOOT-POUND TRANSITION TEMPERATURES-°F (CENTERS OF 15° INTERVALS)

FREQUENCY distributions of 15-ft-lb transition temperatures of plates

Table I. Comparison of Plates in Three Fracture Categories

Nature of Fracture	*No. of Plates*	*Avg. 15 ft-lb Trans. Temp.*	*Standard Deviation*
Source	30	102.5 F	25.0 F
Through	45	65.7	17.5
End	38	56.3	20.1

metal should uniformly possess the properties anticipated by the designer, and these properties should not be affected adversely by fabricating operations or operating conditions.

Second, the design should produce a sound structure capable of performing its required functions under all operating conditions.

Third, the work of the fitters, weldors, supervisors and inspectors must carry out the ideas of the designer and must produce joints of the strength which he intended.

The metallurgy division of NBS has been concerned primarily with the first of these factors, the mechanics division of NBS with the second.

Fractures Were Brittle

In the usual tensile test, the type of steel from which ship plates are made elongates under load more than 20% in 8 in. and shows a reduction of about 50% in cross-sectional area. This indicates that the material is capable of considerable plastic deformation before it will fracture.

The fractures in the ships, however, showed very little evidence of plastic deformation or ductility. Nearly all these fractures were of a brittle type, characterized by a coarse granular or crystalline appearance. The reduction of thickness at the fracture edge was very small, usually less than 2 or 3%. The fact that paint or scale on the plate surfaces was not cracked, even very near the fracture, showed that the fractures had propagated with very little plastic deformation of the steel.

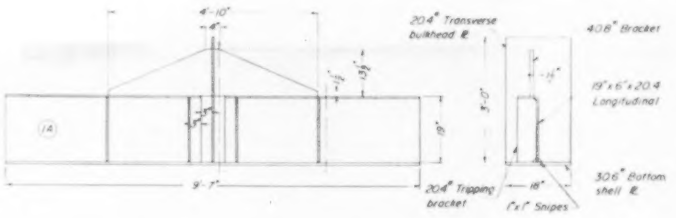
A similarity to ship fractures was observed in tests of notched specimens in tension or bending, particularly at low temperatures. Fractures in ships also occurred most frequently at lower temperatures. Furthermore, the starting point of a fracture could be traced, invariably, to geometrical or metallurgical notches. This phenomenon is called notch brittleness. It is not peculiar to ship plate alone, nor is it confined to metals.

Herringbone markings or chevrons were found to be characteristic of the brittle-type fractures in most of the ship plates examined. Tests conducted at NBS about 15 years ago to determine the source of a brittle failure of an aircraft part showed that a brittle failure may be produced in a normally ductile metal by applying a tensile stress to a notched plate specimen. These tests also established the fact that the chevrons always point back toward the origin of the fracture. This fact makes it possible to locate sources of the fractures in the ships.

Notches in ship construction can result from structural or design details, fabrication processes or welding defects. The source of a number of fractures examined was found to be a discontinuity in a longitudinal stiffener welded to the shell plate within a few inches of a transverse bulkhead. The longitudinal was interrupted for a space of about 6 in. to allow for insertion of the transverse bulkhead, to which it was connected at a point several inches from the shell plating. The connection to the bulkhead was made through gusset plates on the flanges of the longitudinal. This condition constituted a structural notch at the abrupt end of the longitudinal stiffener. The particular design detail has been responsible for a number of failures in tankers and is one of those being investigated by the NBS mechanics division.

Index to Notch Brittleness

To evaluate the factor of notch brittleness, impact tests using V-notch



DETAILS of interrupted longitudinal specimens. Specimen 1A is the original basic design. In specimen 2A, material has been removed to make a less rigid design. In specimen 3A, material has been added to reduce stress concentrations

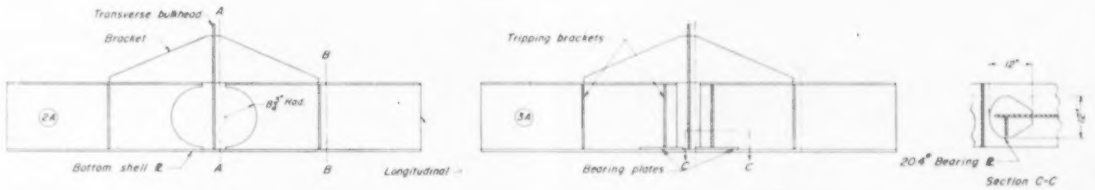


Table II. Results of Interrupted Longitudinal Tests

Type of Specimen	*Test temp, degrees F*	*Maximum load, lb*	*Energy to fracture, ft-lb*	*Type of Specimen*	*Test temp, degrees F*	*Maximum load, lb*	*Energy to fracture, ft-lb*
1	0	750,000	30,700	2	0	774,000	46,100
1A	—15	843,000	28,300	2A	0	993,000	121,600*
1A2	40	1,083,000	102,900*	2A2	0	918,000	141,000*
1A3	20	1,015,000	62,700	2A3	—20	826,000	11,300
1A4	— 5	905,000	36,300				
1A5	5	1,052,000	94,100	3	0	843,000	49,700
10A	0	960,000	64,300	3A	10	1,091,000	126,300
11A	— 5	912,000	36,000	12A	— 5	1,047,000	65,900*

**Broke outside of intersection*

Charpy specimens were included in the examination of the fractured plates. In this test, the notched specimen is supported at the ends and struck by a pendulum on the face opposite the notch. Since the pendulum breaks the specimen at the lowest part of its arc, the energy absorbed in the fracturing process can easily be measured.

To yield full information, such impact tests should be made at a series of temperatures. Most steels are found to be notch tough at higher temperatures, but as the temperature is lowered they become more brittle and the energy required to produce fracture is reduced to a small fraction of the energy that can be absorbed at higher temperatures.

The range of temperatures within which these changes take place for a given steel is called the transition range of that steel. For convenience, a specific point in this range is referred to as the transition temperature. It is usually defined by such criteria as the temperature at which the energy absorbed is 50% of the maximum, or the temperature at which the energy absorption is at a definite level, say 15 foot-pounds, for a V-notch Charpy specimen. The transition temperature is one measure of the notch brittleness of the steel.

The plates in which the ship fractures originated showed higher transition temperatures than plates which did not contain a fracture source. The fractured plates were classified in three categories: (1) those which contained a fracture source (in the ship failures), (2) those which were fractured through and (3) those which contained the end of a fracture. The transition temperature was taken at the energy-absorption level of 15 foot-pounds. Then frequency distribution curves were made of the transition temperatures.

Table I contains the essential data of the plates in the fracture-source, fracture-through and fracture-end categories. The distribution of the fracture-through plates approximated the normal probability curve. The fracture-source plates were found to have a higher average transition temperature, while the relative proportion of fracture-source to fracture-through plates in each interval increased with increasing transition temperature. The latter fact indicates that the probability of a fracture starting in a plate increases markedly with increasing notch sensitivity of the plate.

The plates with high transition temperatures, in which fractures are most likely to originate, represent the relatively few plates whose notch sensitivity falls in the tail of the probability curve for steels of the quality used when these ships were built. This suggests two remedies:

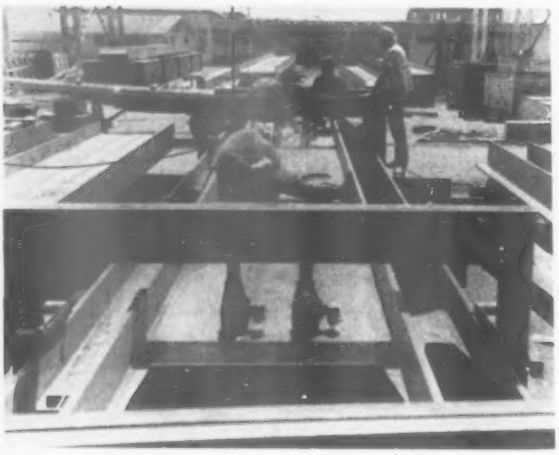
(1) Improve the average quality of the steel with respct to notch sensitivity. This would have the effect of moving the entire probability curve in the direction of increased notch toughness, with the result that a much smaller proportion of the plates in the tail of the curve would fall beyond acceptable limits of notch sensitivity.

(2) Determine the notch sensi-

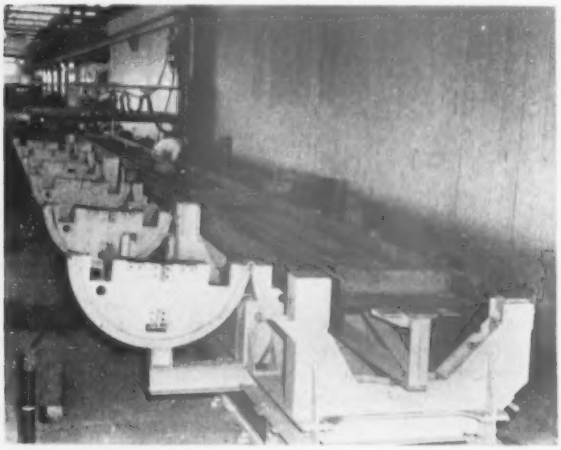
(Continued on page 55)

Making a big beam bigger . . .

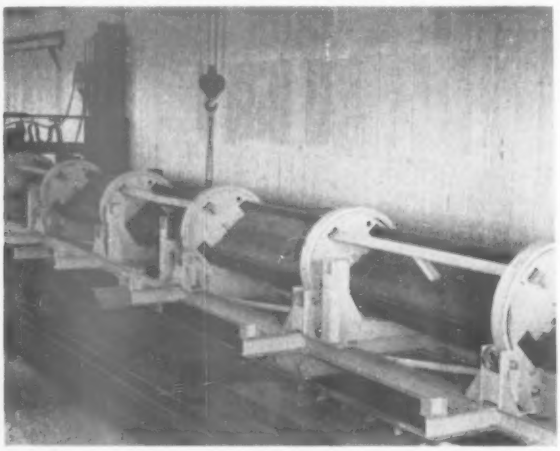
1—GRINDING edges is early step in increasing web from 36 to 48 inches. Edges are square, not beveled



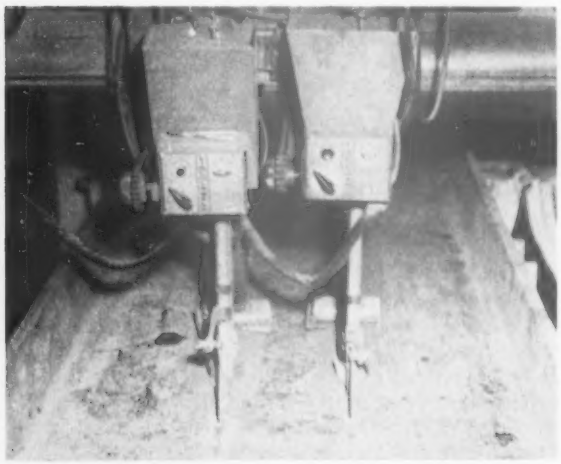
2—ASSEMBLY of ground T-sections and insert plates in tack-welding jig. Note how widened beam is leveled



3—RINGS are parted as the jig for submerged-arc welding carries the beam beneath twin welding heads



4—CLOSED rings clamp the beam while it is being turned by an overhead crane. Note the hook on left



5—TWIN HEADS weld both seams at once, 12 inches apart. The beam moves; welding heads are stationary

6—WITH WEB increased, the beam is heated locally while a compressive load is applied for straightening

"No job too BIG . . . or too small"

Title of this article is the slogan of Union Steel Co., Los Angeles, a firm that handles many diverse jobs in its structural and aircraft divisions.

BY FRED M. BURT

ABOUT 600 workers, including 40 certified weldors, are employed at the large, modern plant of the Union Steel Co. in the East Los Angeles industrial area. The company has two widely varying divisions: structural (founded in 1940) and aircraft and missiles (founded in 1950). All types of welding are done, including submerged-arc, automatic inert gas, metal inert gas conventional metal-arc welding, gas welding and spot welding. Materials fabricated include steel, stainless steel, aluminum and alloy metals.

The heaviest jobs are found in the structural division, which produces large structural members for bridges and steel buildings. Union Steel has its own bridge-building crews and does much work for the California State Highway Department.

Widening Web on Beam

Let's look at one of the biggest jobs at the Union Steel plant: increasing the depth of a very large I-beam by adding onto the web. Pictures 1 through 6 tell the complete story. The beam is 83 ft long with a web 7/8 in. thick. The job was to increase the depth of the beam (or height of web) from 36 to 48 in.

First, the I-beam was split down the middle of the 36-in. web to produce two T-shaped sections. This work was done with a straight-line cutting machine, set with guides to the beam flanges; it produced an even, accurate torch cut down the exact center of the web.

The web was then spliced to the required 48-in. depth by inserting steel plates 12 in. wide and 7/8 in. thick. It was impossible to find one plate 83 ft long, so three plates were cut to size with a multiple-torch cutting machine. A plate 40-ft long was placed in the center, while two 21½-ft strips were laid at either end.

Next, all of the edges were ground (photo 1). Grinding was done to remove scale, burrs and other foreign matter and to provide square, smooth edges. The edges were not beveled, as would be done in the convential method of edge preparation. The penetration of submerged-arc welding is so great that a wholly satisfactory two-pass weld was made with a square butt joint. This saved a great deal of labor for beveling and also saved considerably on weld metal. The conventional method would require a double-vee joint for plates of 7/8-in. thickness, and that can swallow up an enormous amount of weld metal in two seams 83 ft long.

The third stage, photo 2, consists of assembly and tack welding. The two T-beams are placed with their webs horizontal and assembled with the three lengths of insert plate. The flange at the right of photo 2 rests against jig plates, which are in a vertical position and in exact alignment. Working from one end to the other, a jack is used to put the whole beam in compression against these abutments. Wedges hold the alignment thus secured.

The web sections are leveled (as shown in the picture), and the insert plates are welded to each other and tack welded to the webs of the T's. Then five stiffeners are welded across the web to hold the alignment when the beam is transferred by crane from the assembly table to the submerged-arc welding jig (photo 3).

Submerged-Arc Welding

The jig is 82½ ft long or nearly as long as the beam. With beam overhang at either end, this jig can handle beams up to 109 ft long for depth increase up to 54 in. The welding machine (left of photo 3) remains stationary while the beam carriage is moved beneath it. Before the long seams can be welded, however, the cross stiffeners must be cut out with a cutting torch. This operation is also shown in photo 3.

The welding jig has six hinged rings, which are each 5 ft 7 in. in diameter and are spaced 13 ft 11 in. apart. The beam is held in place by slots cut into the two halves of the rings. While the beam is being welded, the upper halves of the rings are swung back, as in photo 3, to allow unobstructed movement of the two seams beneath the welding heads.

When the beam is to be turned, the upper halves of the rings are brought down over it as in photo 4. The two ring halves are clamped together, and the jig is engaged by crane hooks.

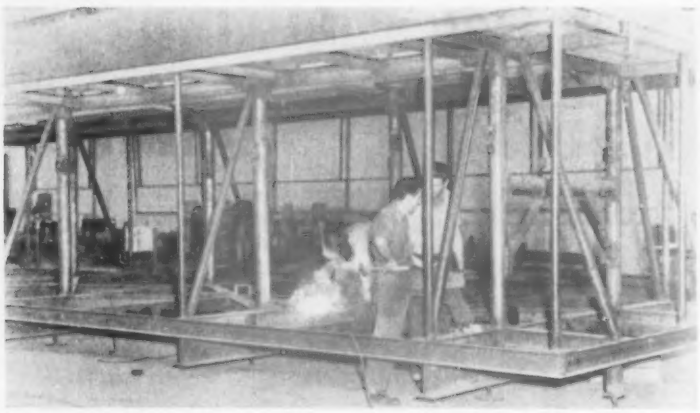
The first pass is made on the opposite side from the tack welds with a current of 800 amp. The beam is then turned over by overhead crane. The second pass is made right over the tack welds. Photo 5 gives a close-up view of the twin submerged-arc heads as they make the second pass on both seams simultaneously. This welding is done at 875 amp, 40 volts, with 5/32-in. welding wire, while the beam jig moves the seams along at a speed of 14 to 16 ipm. Movement of the jig carriage is actuated by a one-hp electric motor, which has a rheostat control for variable-speed travel up to 36 ipm.

Flame-Straightening

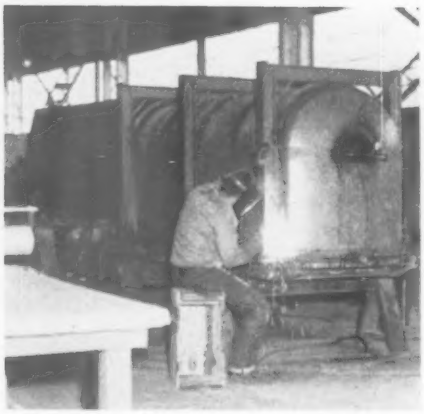
The welded I-beams are carried by crane and placed parallel to the table on which they were assembled. The next operation is flame-straightening (photo 6). Using a 25-ton jack, the web is leveled from end to end in moves of 18 in. While it is under jack compression at each point, two workers heat the area with torches for about five minutes, then quench the heated surface with water. The effect is to straighten the web until it is entirely level.

The straightened beams are carried out into the yard for the location and welding of five transverse stiffeners. These stiffeners are similar to these that were placed on the beam immediately after tack welding. One goes at each end of the beam and three are equally spaced between the ends. Their addition to the beam is a job for manual arc welding.

The Union Steel Co. plant includes



7—IT'S CALLED "rough," yet the structure above (framework for aircraft wing assembly jig) must be made to a tolerance of 1/16 in.



8—PLASTER templates for aircraft will be sealed from the air in metal "coffin"

seven buildings on a 16½-acre tract. The main manufacturing building is divided into two equal bays, each 840 ft long by 75 ft wide. Full-span craneways carry 10-ton cab bridge cranes. There are four cranes to serve the structural division; three cranes for aircraft and missiles. The craneways extend 200 ft out of the building at each end. They can thus reach the stock area at the north end of the building and the yard back of the offices at the south end.

The machine shop, tool room and template shop are housed in a lean-to 720 ft long by 35 ft wide. Machine equipment includes planers, boring mills, milling machines, engine lathes, traveling radial drills, multiple spindle drills, hydraulic press brakes, pyramid and angle rolls, plate and angle shears, abrasive cut-off saws, band saws, swing lathes, shapers, grinders, drill presses, etc.

Welding equipment includes 35 400-amp d-c arc welders and 15 portable welders for tack welding of various makes. The portables are both d-c and a-c, 200, 300 and 400 amp. Other equipment includes metal inert gas, tungsten inert gas, fixed and portable submerged-arc welding machines, flame-cutting machines and oxyacetylene rigs with all types of welding and cutting torches.

Aircraft and Missiles

Since the company was founded in 1940, its personnel has increased from 25 to around 600 persons. The greatest volume of work is done by the 13-year-old structural division, but the volume of the 3-year-old aircraft and missiles division is rapidly and continually increasing. Among products manufactured by the latter division are aircraft accessories and equipment, aircraft sections, missile and jet accessories, missile equipment, aircraft buildings and hangars, jet shipping drums, radar towers and other items.

Currently, the major production of the aircraft and missiles division is on precision-built fixtures and jigs. These are used in the assembly of various parts of aircraft frames by such companies as Convair, Northrop, Douglas and North American.

Construction of an aircraft assembly jig starts with the erection of the so-called rough structure (photo 7). The "rough" structure has to be kept within a positional tolerance of 1/16 in. It is made from pipes and structural shapes. The components are cut out to specified dimensions and are welded into a strong, heavy framework that will allow no deviation in the delicate positioning of attachments.

The precision-machined aluminum attachments are fastened to the framework, either to form contours or to provide for location of guidance points. Instruments that can locate points within a tolerance of 0.0003 in. are used in this close precision work. The welded rough structure has to be built to allow for even the final machining on the fixed attachments.

Another interesting job that the writer witnessed was the fabrication of a hermetically sealed container for the preservation of aircraft master templates (photo 8). The templates are made of plaster, a material subject to atmospheric deterioration. Their steel storage case has upper sections and bases that are fitted together with a special gasket to provide air tightness. The sections are locked and sealed and then the air (and any moisture it contains) is evacuated by pumping it out through tubing at one end. Such "coffins" may be used for the shipment of templates as well as for their storage.

Large-Size Weldments

All in all, Union Steel handles an extraordinarily wide variety of carefully engineered fabrication jobs that involve welding. One such was the manufacture of huge ducts for the Southern California Edison Company's Etiwanda steam plant. These rectangular ducts were laid out on the marking table, cut to size on shears and with torches, assembled, tack welded and finally finish welded.

Other huge weldments that I saw being made here were aircraft hangar doors for the National Guard. Components for the doors were assembled on a jig made of I-beams and tack welded together before they received their final welding in the downhand position.

Union Steel's present president, A. W. Lewis, is also the man who founded the company back in 1940. Mr. Lewis brought to the enterprise a background of 32 years of experience in steel fabrication. Other key men are: Peter Dalebout, vice-president in charge of production; his assistant Tom Harris; H. A. Lees, chief engineer; John Vincent, supervisor of manufacturing operations in the structural division; and Frank Struber and "Tip" Weber, supervisor of manufacturing operations in the aircraft and missiles division.

AXTELL answers about 25% of the telephone calls, says that it's a good way for a president to find out what's up

RUSH call: Salesman Ken Brown took his coat off and went to work splicing hose for a customer

Shirtsleeves Distributor

What does it take to build a million-dollar business in six years? For one thing, a willingness to take your coat off and work wherever you can best serve.

BY HERMAN C. PHELPS

WOULD you recommend the use of low-hydrogen electrodes on a broken cast iron ring 48 in. in diameter if nickel electrodes were not available? Would you expect your supply salesman to drive ten miles with a 35c cable lug that was holding up production?

Customers of Essex Welding Equipment Co., Inc., Newark, N. J., receive the benefit of just such welding know-how and supply service. President A. C. Axtell and salesman Joe Conlon, Ken Brown, Jim Rhoades, Fred Premo and Len Riordan welcome the welding problems and are glad to help customers whenever and however they can.

Each Essex salesman has proved his ability so well that most of their customers usually invite them to tour their plants when they call to make suggestions regarding welding processes and materials-handling equipment, positioners, hoists, abrasives, power tools, safety equipment, etc.

Axtell's boys have earned this salesmen's paradise by making recommendations that save their customers money. Brown, for instance, told one company to use phosphor-bronze on copper-to-copper joints instead of more costly alloys. Riordan suggested the use of low-hydrogen electrodes to weld anvil heads of hydraulic riveting machines after everything else had been tried and failed. Rhoades set resistance welders for aluminum production after a customer's design had been changed from steel. Appalled by the lack of fundamental knowledge on the part of the operators, Rhoades also made suggestions regarding proper water cooling, tip contour and dressing. He set the electronic timer and contactors on the machines and got production going in full swing. This ended a real dilemma.

A Living Encyclopedia

The five salesmen handle 1,600 accounts between them, each man having his own territory. Each man also has his own welding specialty. Jim Rhoades, for instance, covers resistance welding; Ken Brown inert-gas welding; Len Riordan oxyacetylene welding and cutting; Fred Premo metal-arc welding. With Axtell's able advice and assistance, these men make up a living encyclopedia of technical welding information.

In the event, a salesman needs the advice or help of an expert on a process different than his own specialty, he is at liberty to call upon the man who knows the most about that particular process or job. Thus Essex can impart technical information that is normally found only in factory-trained technicians.

If you'd like to see one of the Essex sales force in action, let's look at Ken Brown, who was formerly an assistant engineer for the General Electric Co. Brown makes a point of bringing to the attention of the purchasing agents on whom he calls any new products that have appeared in the field. To find them, he is constantly reading the editorial and advertising sections of THE WELDING ENGINEER and other trade papers. As soon as Axtell has stocked a new item, Brown carries a sample with him in his car, if it can possibly be carried that way.

Brown also sells himself and Essex by reminding his customers that any item of the company's $150,000 stock of welding supplies can be delivered at a moment's notice. Many requests are made for just such service. Small articles such as hose repair parts, cable lugs, etc., are carried in Brown's car so as to be able to anticipate customer demands. One of the accompanying pictures shows Brown down on his knees splicing hose for the Industrial Sheet Metal Co., of Clifton, N. J. He came out in answer to a rush call and had the parts and splicing equipment available in the back of his car.

Another of Brown's customers ordered a $13,000 seam welder. Unfortunately, the product design was changed about the time the machine was delivered, so the customer had no use for it. The white elephant was offered to Essex for a fraction of the original cost. Axtell took it off the customer's hands and made himself a firm friend there. Then Brown found another manufacturer who was only too happy to buy it at the bargain price. The result: two satisfied customers.

How He Gets Salesmen

Good salesmen are both born *and* made. Men of the calibre of Brown, Conlon, Rhoades, Premo and Riordan just don't walk in and start to work right away. First come the interviews, then study of their backgrounds and personalities. Axtell requires a salesman to know at least one welding process thoroughly before he can work for Essex. Then comes training: sales meetings once a week (nearly always conducted by factory representatives), sales calls with factory representatives and so on.

The men are given ample opportunity to increase their earnings by an incentive pay system. They receive a salary, commission and expenses plus an annual bonus on all sales. In return, they all give freely of their time and effort and are not afraid to work long and hard. They also stay on the job year in and year out.

Was Once a Banker

Andy Axtell was born Dec. 11, 1911, in Sidney, Australia. He is a naturalized citizen of the United States. Graduating from high school in Cleveland, he worked three years for a large savings bank while he continued his college studies at night. These years with the bank proved invaluable to him taxwise when he organized his own company.

By the time he had worked himself up to the auditing department, Axtell decided to quit the banking business. Thinking that the welding industry looked like a fertile field, he applied for a position as field salesman with The Lincoln Electric Co., Cleveland. He was given a year of factory training and then transferred to the New York office. There he worked inside the first year and then did eight years of outside selling in Manhattan, Long Island and New Jersey.

IN ESSEX showroom, Bob Gerwick, inside salesman, is waiting on a customer (out of sight in photo) while he talks to a factory representative

All this while, Axtell had been continuing his studies at night school. He took metallurgy, electrical and mechanical engineering, design and structures, business management and sales engineering, promotion and advertising. These courses all came to good advantage when he resigned from The Lincoln Electric Co. in 1945 to go into business for himself as a welding supply distributor in Newark.

The first year was all work and no play. Axtell was a shirtsleeves distributor from the first. He filled orders, loaded, unloaded and drove trucks and did paper work besides calling on customers. Busy as he was, however, he did not neglect the all-important task of letting prospects know that he was in business.

To do this, Axtell made constant use of direct mail, classified advertising and even newspaper display ads. To these media, he later added advertising novelties such as cigarette lighters, pencils, etc., which he is constantly giving away. At first Axtell's direct mail was handled by an outside company, but the volume grew to such an extent that he was forced to purchase an addressing machine with auxiliary equipment. This investment has enabled the task of getting out the mailings to be taken care of by one fulltime employee.

By his drive and business acumen, Axtell has built up Essex Welding Equipment to an annual volume of over $1,000,000 a year. Sales for the first year (1945) reached $175,000; sales for both 1951 and 1952 were over the million-dollar mark.

Essex now represents 37 manufacturers in the welding industry. He carries about a 45-day supply or a total inventory in excess of $150,000. This runs between 1½ and 2 times the monthly sales figure. All inventory is on a visual basis, and supplies are constantly inspected.

Representing such an array of companies in the welding industry entails problems. Materials should be available on short notice; delivery service must be dependable and fast; orders must be processed without delay. Most important of all, the customer must be made to feel dependent on Essex for everything necessary to run his business.

Export and Government

American companies with affiliates abroad have found that supplies purchased through Essex are ready for overseas shipment and on the docks in one-third the time normally required. Factories require from three to six weeks to process and ship export orders. Essex can deliver the same order in one week. Part of the success of the export business is due to a minimum of red tape and paper work. Axtell feels that if manufacturers would check more carefully their costs of handling this type of business they would be glad to turn it over to distributors.

A considerable percentage of the total business at Essex has represented government purchases, but

SHIPPING department is the charge of Leo Gorski (recently promoted to vice-president). Note the heavy-duty equipment for handling large crates

only 10% has gone directly to government agencies. Essex is not in a position to handle very much of the direct government business due to the special packaging requirements of the various branches. In most instances, such specialized orders can best be handled by the manufacturer. The standardization programs being carried on between the armed services and industry may change this situation to some extent.

Over half the 1,600 customers make purchases once a month. Over 70% of the 2,500 to 3,000 invoices mailed each month are under $20. This means lots of paper work, but three people handle it all—a bookkeeper, an order typist and a secretary. They are aided, though, by a $5,000 bookkeeping machine that can do everything but talk. This purchase caused Axtell to think long and hard. Now, however, he feels that it was one of his wisest investments.

Boss Answers Telephone

To keep himself informed on what is going on, Axtell personally answers 25% of all telephone calls. This helps him to keep in personal contact with customers and to keep track of the job his salesmen are doing. He answers many calls from customers having questions regarding processes or types of equipment to use under specified conditions.

Three employees help Axtell to handle the telephone calls. Two of these telephone workers also take care of over-the-counter sales and check inventory.

There are two men in the shipping department who take care of shipments and put away stock, and four truck drivers. The drivers load and unload their own trucks. If they have any spare time, they make up standard lengths of oxyacetylene hose and welding cable or help with the stock.

Axtell personally does 90% of all purchasing. He closely watches costs and tries to receive the benefit of quantity prices and period discounts.

Active Outside, Too

Great as the demands of Axtell's business have been, they have not been able to absorb the whole of his time and energy. He is now mayor of his home town (Livingston, N. J.) and on the committees in charge of industrial and veterans' housing projects. He is a member of the Kiwanis Club, of the American Welding Society and of the National Welding Supply Association. He is also president of the Parkhurst Realty Co., president of the D & D Truck Rental Co. and president of Auto-Dynamics, a distributor of motor lubricants.

There is no better proof what Axtell has been able to accomplish during the past eight years in business and civic affairs than the dinner that was recently given in his honor by a group of his good friends. Fifty guests were invited and 46 were able to attend. After Andy had been made the victim of caricatures of his past, present and future, drawn by an artist member of the group, he was presented with a kneehole desk having a top of hand-tooled leather as a token of his friends' esteem.

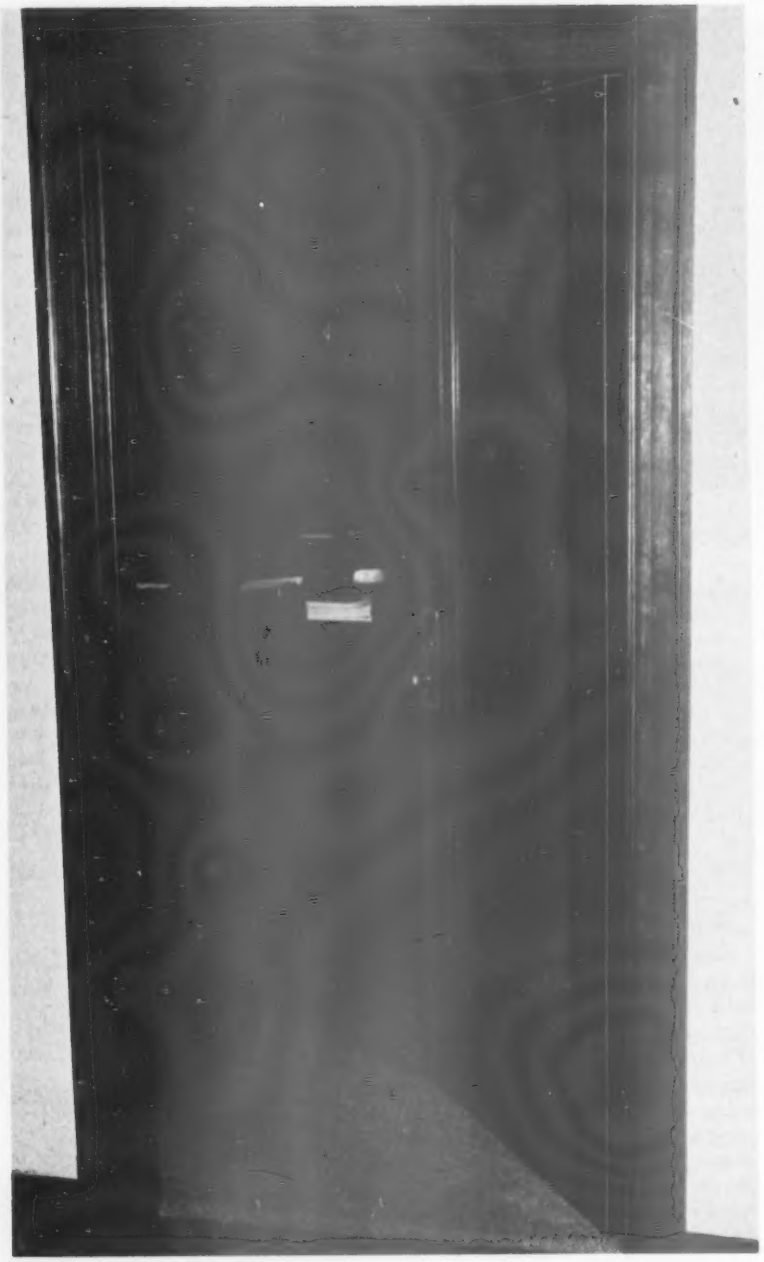
Andy is married and the father of an 11-year-old son and a 7-year-old daughter. Mrs. Axtell finds time to keep her fingers on the pulse of the business. She spends one day a week at Essex and also handles the payrolls for her husband's other companies. Without her help, Andy couldn't get away to play golf. He plays in the middle to high eighties, by the way.

First Salesman Rewarded

Increasing delivery costs in and around Newark caused Axtell to start a new company called Mid-Jersey Equipment Co. It is located in his home town of Livingston, about 18 miles from Newark. When the new concern opened, it was under the management of Joe Conlon as vice-president. Conlon was Axtell's first salesman, who worked long hours and very hard to help bring sales to the figure they are today. One of these days his reward will be ownership of the Mid-Jersey Equipment Co., due to a plan already put into effect. Axtell feels, however, that even this is small payment for Joe's efforts. Such thoughtfulnss and consideration have endeared Andy to all his employees as well as to his customers.

You must have something besides $10,000 ($8,000 of which was borrowed) to make a success of the welding supply business. If you have read this far, you will have an idea of what that something else is.

SEAM welder white elephant was taken off a customer's hands and resold. Purchaser was pleased, too



An Advertising Program Will Open Doors for You

BY R. S. SCHMIDT
Manager, Dealer Sales, Air Reduction Sales Co.

ADVERTISING will make it easier for you, as a welding distributor, to gain admittance to the offices and plants of your prospects and customers. Advertising sets the stage for your entrance in person.

Advertising pays. If it didn't, industry would not spend billions of dollars a year for the purpose of putting company names and products before the public. All advertising, however, does not pay equally well. Welding distributors (who don't have all kinds of money to spend) must make sure that they select the most effective methods.

Advertising is an overhead expense—an increase in the cost of doing business. It can be justified only if it eventually brings about sales from which the profit is greater than the advertising costs. Unless it does this, advertising is of little value to the welding distributor. It must promote your business and sell the items you have available. Properly directed and keyed advertising is of fundamental importance to the success of your business.

Advertising to be effective cannot be haphazard. It must follow a definite plan. It must be sufficiently consistent to keep your name before your public. Infrequent advertising is almost the same as no advertising at all. Advertising that has been properly planned will accomplish definite objectives for the welding distributor.

Advertising gives the prospect a feeling of familiarity with you and the products you sell. This makes him glad to see you. If the advertising you are doing has been properly planned, it will give advance information on your organization, the products you sell and the service you are making available to your customers. It will tell your prospects and customers about the utility and versatility of the products you handle, showing them how they may obtain the greatest value from dollars spent.

When you or your salesman are not in a position to make a personal call, planned advertising comes to your aid. Your advertising program will answer the questions (or at least some of them) that you would answer on a personal call. Lastly but very important, advertising creates a subconscious preference in the customer's mind for your products, your services. This can greatly simplify your selling job.

How Much Should You Spend?

The welding distributor, whether he is new at the game or has been in business for some years, is often at a loss to know just how much he should spend on advertising. He realizes, of course, that a certain per-

centage of his sales volume should be allocated to advertising, but just how large should that percentage be?

By studying the results of the advertising program of many welding supply distributors, it was found that a new distributor should spend from 2% to 5% of his anticipated sales for advertising. The little phrase, "anticipated sales," means, of course, that you are guessing as to what future sales will be over a definite period of time such as a year. What happens if you guess wrong?

You may guess too little, or you may guess too much. In either case, the outcome is easy to see. If you have guessed too much—overestimated your anticipated sales—that part of overhead which is charged to advertising is too high. If you have guessed too little—underestimated your sales volume—it would seem safe to say that you could spend more money on advertising. Such expenditure might even boost your sales volume still higher. On the other hand, when business is worse than you had anticipated, it would not seem wise to cut down too drastically on advertising. Business might get still worse if you do. It can grow very easily into a sort of vicious spiral, resulting in ever lessening sales for you.

If a distributor has been in business long enough to establish himself as a permanent fixture in the community, advertising expenses can be reduced percentagewise. We say percentagewise because the sales of the established distributor are much higher than they were when he started business. Even though he reduces his expenditures for advertising percentagewise, the actual amount in dollars may be much greater than when he initially started in business.

A great deal also depends upon competition. The distributor who is in a highly competitive market area may have to continue spending the same percentage of sales as he did when he began, say, from 2% to 5%. If competition is not so pressing, possibly he can do an effective job for 1 to 3% of his sales volume. For the overall picture, it has been found that the average welding supply distributor spends between ¾ and 1½% of his annual sales volume. Probably not enough.

There are ten principal ways in which the welding distributor can spend his advertising dollar. All of them are advertising, but not necessarily the form of advertising that we most commonly think of such as newspaper and magazine space, radio, TV, etc.

Let's take a specific example of an actual welding distributor set-up. This is a small distributor, having about 500 customers and some 1,500 prospects. He is doing a volume of about $10,000 a month. Assuming that he is an average distributor, he will spend from between $75 (¾%) and $150 (1½%) per month on advertising. How he spends it will depend upon what he wants his advertising to do.

Ten Ways to Advertise

The ten ways in which a distributor may spend advertising money are:

(1) Catalogs.
(2) Organization promotion.
(3) Store and showroom promotion.
(4) Direct mail.
(5) Classified directory advertising.
(6) Telephone selling.
(7) Newspaper advertising.
(8) Exhibits, clinics and demonstrations.
(9) Gifts or premiums.
(10) Dealer aids.

No. 1: Since our distributor is doing only $10,000 a month business, he would have no particular need for his own catalog. The money he has allocated to catalog advertising would be spent primarily for imprinting catalogs provided him by manufacturers. The charge for putting his own name on a manufacturer's catalog is very little. In all probability, our distributor would not spend more than $5 a month for this phase of advertising.

No. 2: "Organization promotion" may include many things. One is the use of signs along the roadside, on the sides of your trucks or in other places to acquaint the public with your name, the location of your store, the products you handle and the service you are prepared to render. You may not believe it, but advertising of this type can be done for $10 to $15 a month. One reason for the low cost is that some welding equipment manufacturers will provide outdoor signs of sheet metal at a nominal cost. Such signs may be as large as 30 by 36 inches and of 18-gage steel. You can mount them on buildings, trucks, fence posts, etc., and they will stand up for a long, long time.

No. 3: The amount to spend for store or showroom advertising will depend in a great measure upon the location and character of your sales room. If you have show windows, you will undoubtedly want to have real window displays instead of just an assortment of junk in the windows. Effective displays will pay off by stimulating sales. Coming into the store, it is well to have counter and other points-of-sale displays since these are self-selling. Product displays, even when very elaborate, are usually furnished without charge provided the distributor purchases the necessary equipment for "loading" the display unit. Normally, $10 to $30 a month should be adequate to take care of your window and showroom advertising.

No. 4: Direct mail advertising should probably represent your heaviest expenditure. It is your advance agent, "the handshake ahead of meeting."

With direct mail, you can pick your audience, for you have full control over the mailing list. Exercise that control! Limit the list to bona-fide customers and prospects. And keep your mailing list up-to-date to avoid waste circulation.

The need to keep a mailing list up-to-date cannot be emphasized too greatly. A large publishing company recently announced that on a particular list of subscribers to a magazine there was an average of 1.13 changes per year *for each subscriber*. More than 100% changes in the mailing list! This means that your mailing list can become obsolete very quickly if you do not keep it up-to-date.

Direct mail must be used regularly. A regular program will maintain a continuity, which is most important in familiarizing prospects with your

How Much?

You may guess too little, or you may guess too much. What can you go by? Your best guide is the experience of others in the welding supply business. See monthly budget on page 51.

products and services and bringing about sales. If you have almost but not quite made a touchdown with your first folder, the second or third will probably push the ball over the goal line. To carry out a direct mail program effectively, our distributor with the 1,000-name mailing list must spend from $25 to $50 every month.

No. 5: Classified directory advertising has a definite advantage because it appeals to the people who are in particular need of what you have in stock at a time when they they are fully conscious of that need and are trying to satisfy it. Tie your own name to the nationally advertised products you sell. Customers are tradename conscious and look for the products they know of through national advertising. If you want to save money, you can carry just a listing of your name and address, but it will not be nearly as effective as a small display ad. The cost varies with your local directory, but is usually not very much when compared with other types of advertising. If you are running a tie-in ad stressing a particular tradename, the manufacturer whose product you sell might be persuaded to share the cost of the ad with you on a fifty-fifty basis. In this manner, you obtain the advantage of a tradename listing at very little extra cost. Normally, a classified listing would cost you around $2.50 a month.

No. 6: Telephone selling often jogs the customer's or prospect's memory so as to bring to you orders that otherwise might not come your way. It is difficult to evaluate the cost of this type of advertising, which involves both employees' time and telephone charges. The cost can be held to a minimum if you use employees (they should be trained in telephone selling) at times when they have nothing else to do. Probably $1.50 would take care of the telephone charges unless out-of-town calls are involved.

No. 7: Newspaper advertising may be either display or classified advertising. Whether or not you can use one or both of these profitably depends largely upon your location and the type of newspaper coverage available.

If your business is in a large city, it is almost certain that you can't use display advertising profitably. Even classified advertising will not be of much value to you except under unusual circumstances. Big-city newspapers have large circulation, for which you must pay a high advertising rate. The proportion of newspaper readers in an urban population who are interested in purchasing welding supplies and equipment is relatively small. This means that you are paying very high for mostly waste circulation.

EVEN maximum appropriation given by the monthly budget at right figures out as a pretty thin slice of a welding distributor's sales volume

In a smaller town, when the trading area is appreciably rural, newspaper advertising may be very profitable for the sale of welding equipment. There is a higher percentage of potential users of welding in rural areas, and the advertising rates are much, much lower. If you don't know what the response of your area will be, try it out.

If your initial test program indicates that newspaper advertising will prove valuable, it would be well to test classified advertising against display advertising to see which is the more profitable to you. It must be remembered that the test must be made over a period of time. Do not depend on one or two advertisements. Keep your newspaper advertising steady and continuous. Then, after a while, the reader will think of you first when he thinks of welding equipment. With a small-town newspaper, you should spend $5 or more a month if you decide to use newspaper advertising.

No. 8: Exhibits and demonstrations are a form of advertising that welding distributors should not overlook. There are many things you can do. If you are in the city where the state fair is held, it might be to your advantage to exhibit. Likewise, many welding distributors have found it advantageous to have exhibits at county fairs. At any place where you exhibit equipment, you will do well to have the price on it plainly marked. Very often clearly indicated prices will result in on-the-spot sales.

If you are contemplating an exhibit at a fair, think first about the type of audience that is expected to attend. If it is an industrial-minded audience, then participation might pay you. If it's going to be a carnival sort of crowd, avoid exhibiting. Trade shows and grange meetings afford worthwhile opportunities for demonstrating your products since they bring together groups interested in welding products and processes.

You can hold your own fair—one devoted wholly to welding. If you are just starting out in business, an open house gives you an excellent opportunity to meet present and prospective customers. The open house is traditional for new businesses and ones moving into new premises, but it can be held at any time. A much more elaborate affair is the welding clinic.

An open house or a welding clinic demands planning. Set the date so the event will be held when customers are not likely to be too busy. And be sure you have room enough. The open house traditionally should be at home, but the welding clinic may be staged anywhere. If your place of business is not large enough, or if it is not centrally located, then consider

MONTHLY ADVERTISING BUDGET

for a Distributor Doing a Business of $10,000 a Month

1.	Catalogs	$ 5.00
	Dealer imprinting of manufacturers' catalogs	
2.	Organization promotion	10.00 to 15.00
	Products	
	Location and stock	
	Services	
3.	Store and showroom	10.00 to 30.00
	Window displays	
	Counter displays	
	Display cabinets	
	Point-of-sale displays	
4.	Mailing plan (1,000 names)	25.00 to 50.00
	Keep it up-to-date	
	Mail regularly	
	Mail frequently	
	Maintain a continuity	
	Personal letters	
5.	Classified directory advertising	2.50
	Name, address and telephone listings	
	Display ads to give tradenames of products handled	
6.	Telephone selling	1.50
7.	Newspaper advertising	5.00
8.	Special events	5.00 to 10.00
	Welding clinic, open house	
	Fairs	
	Trade shows	
9.	Gifts or premiums	7.50 to 15.00
	Matches	
	Pencils	
	Pads	
	Key rings, etc.	
10.	Dealer aids	5.00 to 10.00
	Tape	
	Labels	
	Signs	
	TOTALS—Minimum	$76.50 per month
	Maximum	$144.00 per month

the rental of a vacant garage or other empty building.

In addition to adequate exhibit area, be sure you have adequate promotion. It should include posters, invitations by direct mail and possibly newspaper advertising.

If you are going to hold a welding clinic, see that the program is clearly thought out and is sufficiently diversified to interest all your guests. If this affair has been properly planned, you will probably be able to obtain assistance from your manufacturers. Very likely they will coöperate with tie-in advertising and furnish representatives, demonstration material, etc. With either the open house or the welding clinic, your own employees must be well coached in advance so that they will be able to answer guests' questions and also make the guests feel at home.

No. 9: Gifts and premiums shouldn't be overlooked in your advertising program. They needn't be expensive—the best are little gimmicks that will be brand-new to the recipients. These will pay you well if you can find such items. If you can't . . . well, there are always scratch pads, calendars, automatic pencils, book matches, weldor's skull caps, key rings and the like to fall back upon. In some instances, your suppliers will coöperate to keep your expense down.

No. 10: Dealers' aids always come in handy. You buy these from the manufacturer if you can. Perhaps he has imprinted scotch tape or decals carrying your name. One of these can be placed on each piece of equipment you sell, providing a constant reminder as to where the equipment originated. When repair parts are needed, naturally they will come to you. Also, they are reminded that you are a good source of supply for consumable goods such as electrodes, welding rods, gases, etc.

Now let's see how these various items of expenses work out for our welding distributor who is doing a $10,000 per month sales volume. The accompanying budget shows just how he should allocate his advertising funds on the basis of spending between ¾ and 1½% of his sales volume. Both minimum and maximum costs are given.

We know that advertising pays in general. It is the task of the welding distributor to make it pay for his particular business.

1—ORIGINAL store at 582 Mateo Street in downtown Los Angeles is still busy. Now look at store on opposite page

3—SHOWROOM at the Mateo Street store. Though the interior is relatively small, the stock is complete

4—PASADENA sales room and service counter. Store serves eastern industrial area of Greater Los Angeles

Four Stores

Service is the key word!

IN the short space of 11 years Milt Sims, owner of Absco Welding Supplies, has expanded his operations to include four stores. Most recent acquisition is a store building at 4600 West Jefferson Blvd., Los Angeles, which also houses the company's general offices. Other stores are at 582 Mateo St., in downtown Los Angeles, and at Pasadena and El Monte.

Sims believes in supplementing the usual line of welding equipment found in most welding supply houses with other tools and products for working metals. Today, about 20% of the annual sales volume of all stores is made up of non-welding items. As time goes by, Sims expects that this proportion will be increased in favor of products that are not directly related to welding. Sims' ultimate ambition is to sell every customer all the tools and equipment needed for metal-working. He welcomes diversification since it extends his opportunities to render all-around service to customers.

As can be guessed from photos 1 and 2, trucks play an important part in Absco service. Sims has a fine fleet. It should be noted that all of his trucks have beds somewhat lower than conventional in order to make it possible for the driver to handle cylinders more easily. The "low lift" arrangement on a truck allows the driver to load and unload cylinders without calling for help.

Good Floor Display at All Stores

A complete stock of welding equipment, supplies and parts is carried at all four stores. Interior displays are considered important, too. Photos 3, 4 and 5 will give you a good idea of the showrooms and service counters of the various stores. Photo 3 shows the Mateo Street store; photo 4 the Pasadena store; photo 5 the newest store on Jefferson Boulevard.

Not all of the supplies at the new store are out in

2—NEWEST store (and general offices) at 4600 W. Jefferson Blvd. Other stores are at Pasadena and El Monte

for Absco

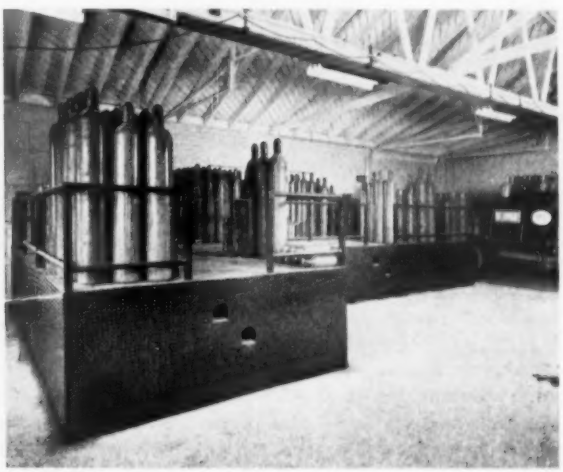
front. Photo 6 shows a portion of the large stocks of welding rod and electrodes in the warehouse portion of the store. Note the manner in which the rods are stored on skids and pallets for easy movement.

A rear view of the Jefferson Boulevard store reveals the cylinder-loading dock (photo 7). It has been built at truck-bed level to make the drivers' loading job as easy as possible. Three loading areas are provided for the trucks.

A continued desire to render the service that customers need and expect has kept Milt Sims growing. Besides selling welding supplies to his customers, he has done an equally fine job of serving his fellow welding distributors as this year's president of the National Welding Supply Association.

5—MODERN showroom at 4600 Jefferson. Plenty of space here for good shelf, counter and floor displays

6—ELECTRODES and welding rods at new store are on skids and pallets for quick, economical handling



7—CYLINDER-loading platform at rear of Jefferson Boulevard store. Platform is a welded steel structure

Illinois EXHIBIT at State Fair featured demonstrations of welding and hardfacing

LETTERED tags on this miniature farm pointed out the jobs that a welding outfit can do for the farmer

Michigan THEY came, they saw, they were conquered by these oxyacetylene displays

SMALLER demonstration tables at "Farmers' Week," a yearly event that draws 25,000 to 30,000 farmers

Reaching Out for Farm Customers

Fair in Illinois

"Hey, Dad, get some popcorn, cotton candy, pink lemonade for the kids—treat 'em to a ride on our super roller coaster—ring the bell for a good cigar — try your own hand at welding and cutting metal."

The scene is the 1952 Illinois State Fair in Springfield. The sounds and attractions are the same as at any other state fair. But what's this about trying your own hand at welding and cutting? Sounds like a new twist, huh?

Well, yes, it was a new idea—at least at the Springfield fair. The exhibit was that of the Ill.-Mo. Welding Products Co., of Jacksonville, Springfield, Quincy and Decatur. The company's circus tent (see our front cover) had a welcome mat out for one and all. About five thousand fair-goers took advantage of this hospitality.

A happy thought had struck the Ill.-Mo. people. Where but at a state fair can the greatest number of farmers and job-shop weldors be informed of the latest developments in welding equipment and techniques? Where else can oxyacetylene and arc welding demonstrations be conducted with so many interested viewers? So up went the circus tent, flaps were flung open, and the passing crowds were invited in to watch the experts weld and cut.

New techniques and equipment were described and demonstrated. If a farmer eyed a torch longingly, he was encouraged to try his own hand with it. Many farmers showed a definite interest in learning how to do their own hardfacing.

During the demonstrations, several useful articles were made from scrap. Weedcutters were made from old mower blades, lawn seats from pipe and discarded disc parts, a barn fan from a steel drum and pipe. These

items were placed on display.

An added feature that attracted youngsters and grownups alike was a miniature farm display. Each piece of weldable equipment was labeled for identification.

When the fair ended, Ill.-Mo. packed up its tent, happy with the knowledge that it had brought its story of welding and cutting to a great many farmers on their own home grounds.

Farm Week in Michigan

Other evidence of the fact that suppliers of welding equipment are biting deeper and deeper in the farm market is the repeated participation of Linde Air Products Co. distributors in Michigan's "Farmers' Week." This event is held each January at Michigan State College, East Lansing, Mich. The attendance runs to 25,000 or 30,000 farmers, young and old.

The college management insists that participants in "Farmers' Week" use only low-pressure salesmanship. They feel that the exhibits should be primarily educational—"show farmers how to do a better job." In line with this thinking, they don't want price tags on the apparatus nor do they want wholesale handouts of literature. On the other hand, they do want distributors and supply people to be able to give out price lists and other such data upon requests of the visitors. There is no charge for the display space, but it is required that every exhibitor give the college 100% coöperation.

The college provides small standard signs bearing company names. A big display of company name and trademarks is not permitted. Each exhibitor is allocated a space of about 10 by 30 feet. This allows four demonstration tables and three other tables for displaying apparatus and supplies.

Demonstrations of heavy welding, building up and flame-cutting were made at one table at the last "Farmers' Week." Near it was located a bench with vise and grinding wheel. Two smaller demonstration tables were used for showing welding and cutting equipment (no actual welding nor cutting). At the third small table, air-acetylene appliances were demonstrated for soldering, paint-burning and heating.

Michigan farmers' interest in oxy-acetylene welding, as evidenced by "Farmers' Week," is on a definite increase. This is hardly surprising in view of the greater mechanization of farm practices.

WHY SOME SHIPS FAIL

(Continued from page 41)

tivity of every heat of steel by inspection tests and reject all heats failing to meet suitable prescribed standards. This would have the effect of "cutting off the tail" of the probability curve.

In order to provide information pertinent to (1) above, the test results were compared with the chemical composition of the steels. An extensive statistical analysis shows that the notch sensitivity is increased with increasing amounts of carbon and phosphorus and decreased with increasing amounts of silicon and manganese. Finer grain size is also associated with decreased notch sensitivity.

Structural Problems

A welded tanker afloat at sea may be considered as a hollow beam of great depth upon which a system of complex and variable forces operate. The weight and proportions of the ship, the type and distribution of the cargo, the type of propulsion and practical fabrication procedures are variables subject to control. The uncontrollable forces of sea and wind can only be estimated. The designer's problem is further complicated by the fact that the steel of which a welded ship is made has pronounced changes in mechanical properties within the range of operating temperatures.

Practical solutions of the problems of designing and constructing a steel ship result in numerous structural discontinuities, especially at the connections of intersecting members and plates. Such a discontinuity often constitutes a "mechanical notch" and nearly always acts as a stress concentrator. Since the load-carrying capacity of a ship as a whole may be seriously reduced by excessive stress concentration, the design details at discontinuities are very important.

Tensile tests of various structural details were made in the laboratory of the NBS mechanics division. Specimens were similar to ship construction as far as material, plate thickness and welding procedures were concerned. Stress studies were made at room temperature—tests in which the applied stresses were below the elastic limit of the material. Since a large number of the fractures occurred in cold water, most of the specimens were tested to failure at temperatures near zero F. Some longitudinal specimens were tested at various other temperatures to obtain an indication of the effect of temperature on the mode of failure.

A source of many serious ship failures was found at the intersection of a bottom longitudinal and a transverse bulkhead. This design detail is repeated more than one hundred times in the structure of a tanker. Three general designs of this detail were investigated. Some results of these tests, grouped by specimen type, are given in Table II. Specimen 1A represents the original design used in T2 all-welded tankers and is relatively rigid. The 2A type specimen is a more flexible structure due to the removal of material by a semicircular cutout. Specimen 3A retains the rigidity of 1A but reduces the stress concentration in the bottom plate by increasing the plate thickness at the point of highest stress. Minor modifications of these designs were made and tested when they appeared practical.

Results of the NBS tests on interrupted longitudinals indicate that the load-carrying ability of the interrupted longitudinal designs does not vary greatly and is probably adequate for the purpose intended. In view of this, the structure that is capable of greater deformation (and is therefore able to absorb a relatively large amount of energy before fracture) is most suitable for this type of service. Similarly, four bulkhead intersection specimens of three general designs were investigated. Results of the tests of bulkhead intersection specimens indicate that the addition of material near regions of high stress is beneficial.

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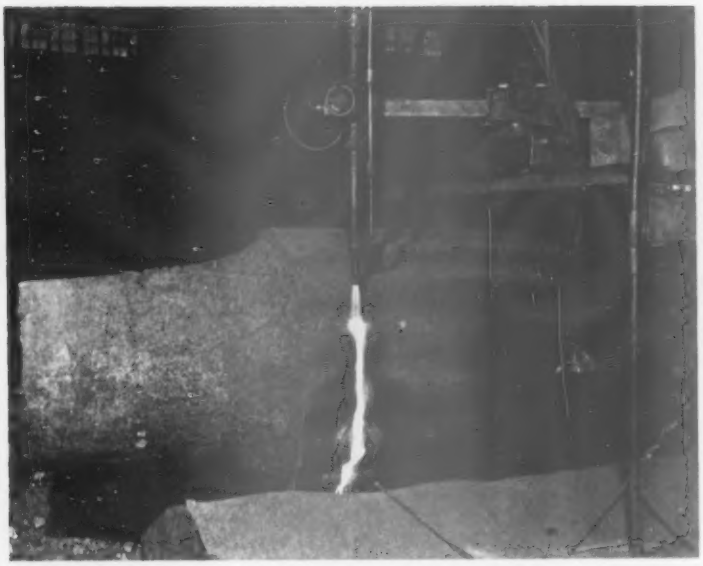
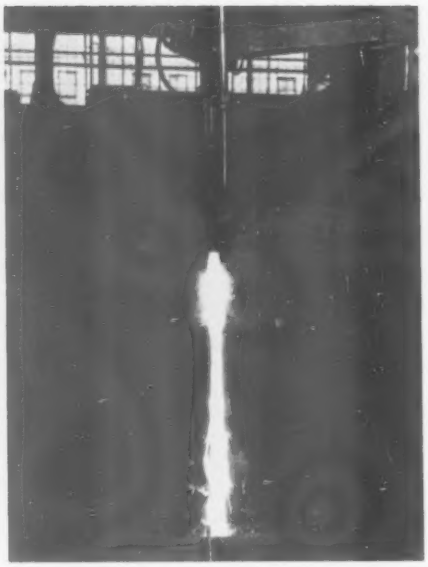


2 minutes Line of cut has just started to show. Note the set-up for automatic flame-cutting



7 minutes Flame is biting deeper as slag pours out of the kerf

52 Inches of Steel Cutting Time: 35 Minutes

By the proper selection and use of equipment, heavy flame-cutting is now being done at speeds that make economical the apparatus, set-up and operating expenses.

WHEN you buy large steel slugs to turn into forgings, you talk in terms of tons. The slug must contain as many tons of steel as the forging, even though the shape of the finished forging may bear absolutely no resemblance to the original slug. Dimensions of the forging slug won't matter; you trim it down to weight, not to size.

When the slug weighs on the order of, say, 30 tons, it is apt to be a pretty thick piece of steel. Cutting through the very least of its dimensions may be a tall order.

An Automatic Operation

The flame-cutting of steel sections of great thickness calls for an automatic set-up, even in single operations. When the cutting is done manually with heavy-duty hand torches (sometimes in combination with an oxygen lance), it is almost physically impossible to cut to extreme depths by hand and stay within reasonable tolerances.

Automatic flame-cutting is being performed increasingly throughout the steel industry—much in the same way that automatic welding is a growing practice among metal fabricators. Moreover, it is accomplished with an ease and speed that make even the more spectacular operations routine.

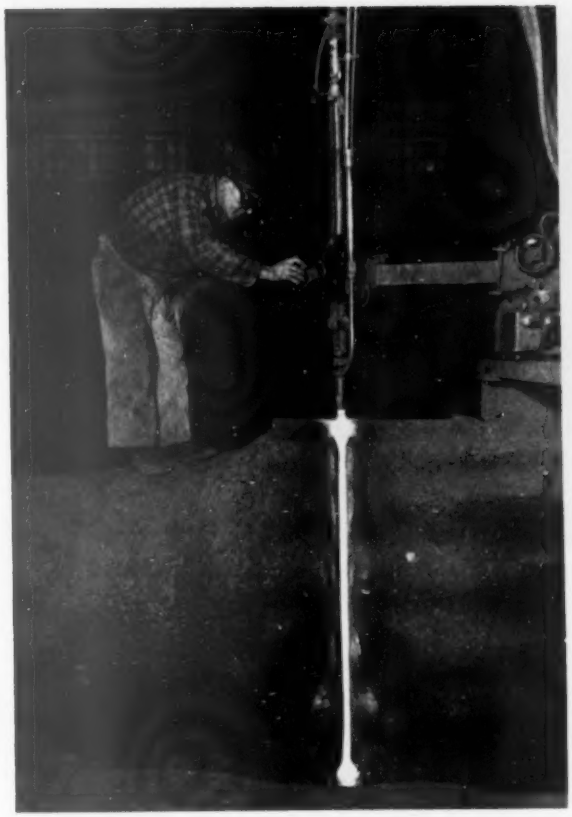
No longer is the cutting of steel sections four to five feet thick an economically prohibitive operation. Nor is it a trial-and-error undertaking. Due largely to the development of new equipment, techniques and procedures since World War II, heavy flame-cutting on a production basis is now standard practice.

Today a standard heavy-duty torch hasn't been stopped yet as far as thickness-to-be-cut is concerned. When mounted on an appropriate carrying machine, it slices easily through huge thicknesses. In proof of that statement, we offer as evidence the accompanying five pictures, which were taken at Industrial Forge and Steel, Inc., Canton, O. The operation was to cut a forging slug from a corrugated ingot of 1030 steel. The ingot was 52 inches in diameter.

Formerly, such cutting (if it could be done at all) required a tremendous expenditure of cutting gases and time. Today how different!

Slug Weighed 20 Tons

The ingot weighed 31 tons. The required weight of the slug was 20 tons. Simple subtraction shows that to bring the slug to this weight, 11 tons of the ingot had to be cut off. Bearing in mind the density of steel and the volume of the tapering section at the end, some precise calculations had to be made to determine the line of cut.



16 minutes

Cutting is well along. The operator raises the torch in order to keep the tip-to-work distance constant

19 minutes

Now the job is over half finished. The brilliance of the molten metal highlights the sharpness of cut

Before starting the cut, the ingot was preheated. Once actual cutting had begun, the end was severed in just 35 minutes. Forward speed of the torch carriage averaged about 1.5 ipm. Pressures used were 9-12 psi for preheat oxygen, 50 psi for cutting oxygen and 10 psi for preheat acetylene.

Essential to the success of heavy cutting operations are:

(1) Adequate supply and pressure of oxygen and fuel gas.

(2) Hose (or pipeline) capacity and regulator capacity large enough to provide the needed gas flows.

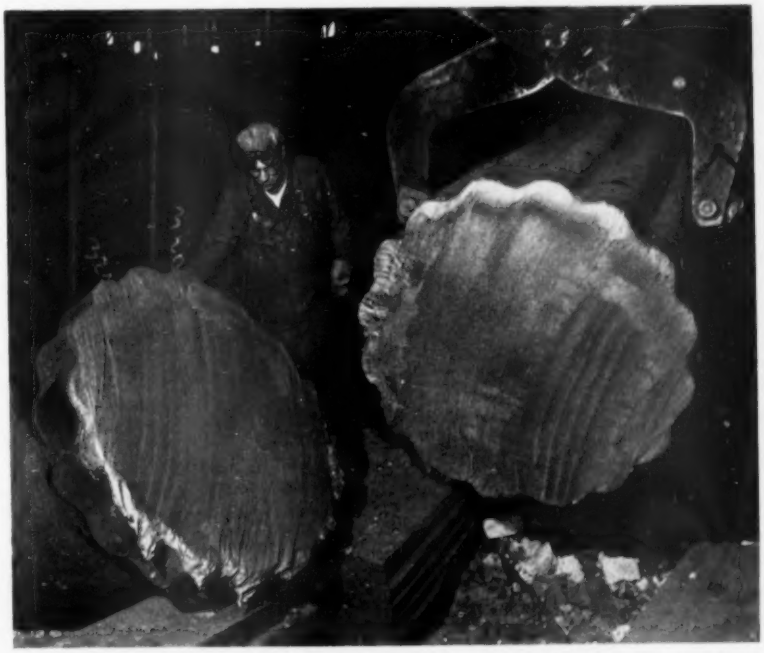
(3) A torch designed to pass large volumes of gas.

(4) A tip with large orifices.

(5) A carriage to afford uniform motion at lower speeds than those normally used for flame-cutting.

(6) A machine that has been designed to carry the complete load of the heavy-duty torch, its hoses and gas-regulating equipment.

Photos courtesy Air Reduction Sales Co.



35 minutes **It's done at last! The 52-inch ingot has been completely severed. Note the smooth surfaces**

To stand up under corrosion and heat resistance, there is a special group of ferrous alloys for castings. These are the "high alloys," designated by the "C" and "H" series numbers of the Alloy Casting Institute. They have contents of chromium and nickel similar to stainless steels, yet they differ in important respects from the familiar members of the AISI 300 and 400 series.

In last month's issue of THE WELDING ENGINEER, *the authors described procedures for welding the straight-chromium cast alloys for corrosion-resistant service. In the present article, they continue with a different group: the chromium-nickel cast alloys. These are widely used for parts exposed to highly corrosive environments.*—The Editors.

No. 1

No. 2

CE-30

How to Weld

Part II—The Chromium-Nickel Alloys

BY EARL M. ANGER, *Chief Metallurgist, The Duraloy Co.*
WILLIAM E. DUNDON, *Foreman, Welding Dept., The Duriron Co.*
GARTH THOMPSON, *Vice-President, MISCO Fabricators, Inc.*

CORROSION-RESISTANT castings made from iron-chromium-nickel alloys are normally exposed to attack by severe corrodents. Less hardy materials would be dissolved, eroded, rusted, stained or otherwise destroyed in usefulness.

As is shown in Table V, chromium-nickel cast alloys may be divided into the chromium-predominant and nickel-predominant classes. All of these alloys are essentially austenite, although some have appreciable amounts of ferrite present.

In their "as-cast" condition, the alloys also contain chromium carbides and occasionally minor amounts of the brittle sigma phase.* Because both of these last constituents lower the corrosion resistance of the metal, castings made of chromium-nickel alloys are normally supplied in the "quench-annealed" condition. Quench annealing is the common term for a heat treatment to divorce the carbon from its combination with chromium and dissolve it in the austenite. This solution heat treatment is usually carried out at about 2,000 F. The carbide-free metal is then quenched rapidly in water, oil or air. Any sigma phase present in the as-cast alloy will be converted by quench annealing to ferrite.

CHROMIUM-PREDOMINANT ALLOYS

There are ten types of chromium-predominant alloys listed in Table V. All contain between 18 and 30% chromium and from 8 to 22% nickel. By far the most widely used are the six modifications (not including CF-16Fa) of the CF type, which together constitute almost 70% of total corrosion-resistant casting production. The CF-8 and CF-20 grades are general-purpose alloys; molybdenum-containing CF-8M and CF-12M are used for more specific, severely corrosive conditions; CF-16F is employed where improved machin-

*Sigma phase is the name for a metallic compound, occasionally found in chromium-nickel stainless steels, that is neither austenite, ferrite nor a carbide. It is usually encountered as a transformation from ferrite after the alloy has been held for a long time at a temperature of from 1,200-1,700 F. However, it may also develop in austenite. *Editor.*

CAPTIONS FOR PHOTOS

Chromium-Predominant

1 Fractionating tower. Sections are centrifugally cast of alloy CE-30; connecting flanges are of forged steel. The flanges, outlets and pads are arc welded to the cast sections. Photo courtesy of Michigan Steel Casting Co.

2 Food-mixing equipment. Cylinders, valves and fittings are cast alloy; hoppers and base are fabricated from type 316 stainless sheet and are welded to castings. Photo courtesy of Michigan Steel Casting Co.

3 Heavy-duty agitators used in polymerization kettle handling chemicals of high viscosity at temperatures ranging from 0-212 F. Assembly is arc welded from three castings, using type 317 electrodes. Center part and four prongs in one plane are the main casting; two side prongs are separate castings. Photo from The Cooper Alloy Foundry Co.

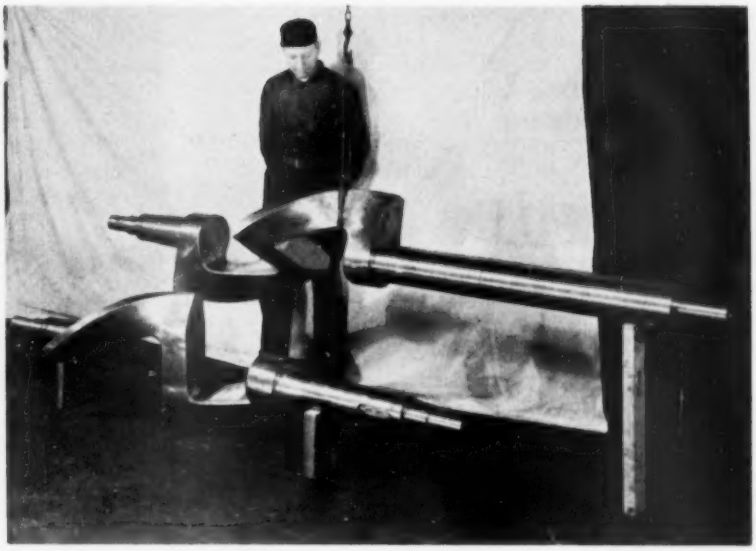
4 Mixer-blade assemblies. Blades are of cast alloy, and end shafts are of forged 18-8, shrunk and welded into position. Photo courtesy of Michigan Steel Casting Co.

Nickel-Predominant

5 Hairpin hook, a device used in the pickling of coils of wire or wire rod, was made by welding castings. Photo from the Duriron Co., Inc.

6 Pump casings represent a common application of the corrosion-resistant cast alloys. Photo from The Duriron Co., Inc.

No. 3 **CF-8M**



No. 4 **CF-8**

High-Alloy Castings

ability is required; and CF-8C, the so-called "stabilized" grade, is used when castings cannot be heat treated after welding. Typical applications for all the chromium-predominant alloy castings are: pumps, valves, fittings, agitators, containers and similar equipment in the chemical processing and other related industries.

Nickel-Predominant Alloys

The three nickel-predominant alloys are CM-25, CN-7MCu and CT-7MCu. Chromium and nickel contents are given in Table V. The nickel-predominant alloys are not used in as great quantity as the chromium-predominant group. They are employed for castings in severe service applications, particularly those involving sulphuric acid. The CN-7MCu grade, which includes several proprietary compositions within its stated chemical ranges, is the most popular high-nickel alloy type.

Carbide Precipitation

In welding the chromium-nickel alloys for castings, the most important thing to watch for is carbide precipitation. Let a chromium-nickel casting be carbide-free and in the quench-annealed condition. Then expose it to a temperature between 800 and 1,600 F. Something happens.

Table V. Designations for Chromium-Nickel Alloy Castings

Cast Alloy Designation	*Wrought Alloy (AISI) Type*	*Cr%*	*Ni%*	*C%*	*Other Elements**
		Chromium-Predominant Alloys			
CE-30	—	26-30	8-11	0.30 max.	
CF-8	304	18-21	8-11	0.08 max.	
CF-20	302	18-21	8-11	0.20 max.	
CF-8M	316	18-21	9-12	0.08 max.	Mo 2.0-3.0
CF-12M	316	18-21	9-12	0.12 max.	Mo 2.0-3.0
CF-8C	347	18-21	9-12	0.08 max.	Cb 8 X C min., 1.0 max., or Cb-Ta 10 X C min., 1.35 max.
CF-16F	303	18-21	9-12	0.16 max.	Mo 1.5 max. Se 0.20-0.35
CF-16Fa	303	18-21	9-12	0.16 max.	Mo 0.40-0.80
CH-20	309	22-26	12-15	0.20 max.	
CK-20	310	23-27	19-22	0.20 max.	
		Nickel-Predominant Alloys			
CM-25	—	9	20	0.25 max.	
CN-7MCu	—	20	29	0.07 max.	Mo and Cu
CT-7MCu	—	15	35	0.07 max.	Mo and Cu

*For the sake of simplification, percentages of manganese, silicon, phosphorus and sulphur are not included in this tabulation. See the complete table of standard ACI designations, The Welding Engineer, April, 1953.

The carbon tends to recombine with chromium and precipitate from the solid solution. During welding, the pool of molten metal will be 2,600 F or higher. Some distance away from the weld, the casting will be below 800 F. Between these two areas, there will be a zone (normally about

Table VI. Current and Voltage Settings
(Chromium-Nickel Corrosion-Resistant Castings)

Thickness, Inches	*Electrode Diam, In.*	*Amperes*	*Maximum Arc Volts*	*Thickness, Inches*	*Electrode Diam, In.*	*Amperes*	*Maximum Arc Volts*
1/16	1/16	25-40	22	1/8 and over	5/32	100-140	25
1/16	5/64	35-55	23	1/4 and over	3/16	130-180	26
1/16 to 9/64	3/32	45-70	24	1/2 and over	1/4	210-290	27
9/64 to 3/16	1/8	70-105	25				

Table VII. Preweld and Postweld Heat Treatments
(Chromium-Nickel Corrosion-Resistant Castings)

Alloy	*Before Welding*	*After Welding (a)*
CE-30	None	None (*b*)
CF-8	None	Water quench from 1,950 to 2,050 F
CF-20	None	Water quench from 1,950 to 2,050 F
CF-8C	None	None
CF-8M	None	Water quench from 1,950 to 2,050 F
CF-12	None	Water quench from 1,950 to 2,050 F
CF-16F	None	Water quench from 1,950 to 2,050 F
CH-20	None	Water quench from 1,950 to 2,050 F
CK-20	None	Water quench from 2,100 F
CN-7MCu	400 F	Cool very slowly; then heat to 2,000 F and water quench

(a) Time at postheat temperature should be sufficiently long to insure uniform heating throughout the areas and sections involved. Quenching should be drastic enough to insure a rapid rate of cooling from 1,600 to 800 F. Air or oil quenching may be adequate with light sections and low-carbon alloys.

(b) Postweld heat treatment is usually not necessary. However, corrosion resistance and ductility can be improved somewhat by quenching from about 2,000 F.

½ in. from the weld proper) where the parent metal will be heated to 1,200 F, the temperature at which carbide precipitation takes place most rapidly. In this case, "rapidly" means in a matter of seconds. Studies of carbide formation rate have indicated that, in an alloy containing 0.08% carbon, 30 seconds at 1,200 F will cause enough carbides to lower the corrosion resistance appreciably. When the carbon content of the alloy exceeds 0.08%, the amount of chromium carbide precipitated in a short time increases still further, with additional harm to corrosion resistance. Obviously, the low-carbon alloys are the ones you want for welding.

Weld Decay

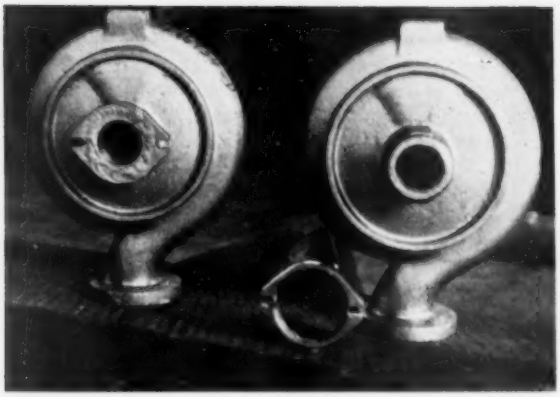
Loss of corrosion resistance in the heat-affected zone is called "weld decay." In wholly austenitic alloys, weld decay results from precipitation of chromium carbides along the grain boundaries. The grain boundary region (according to commonly accepted theory) becomes depleted in chromium and thereby offers a continuous path of much lower corrosion resistance than the grains themselves. It is along this path that attack by corrosive agents proceeds.

Alloys that are high in chromium such as the CE-30 type are not as prone to intergranular attack as the lower-chromium CF grades. Even though the carbon content of CE-30 is high, there is sufficient chromium present to permit carbides to form and still provide adequate resistance to corrodents. Furthermore, ferrite is present in the alloy structure of the CE-30 grade and the chromium carbides prefer to precipitate in the ferrite areas. This saves the austenite grain boundaries. If the ferrite does not form a connected network, there is no continuous path for attack and hence no intergranular corrosion.

Types CF-8, CF-8M and CF-8C chromium-nickel castings are also partially ferritic in normal condition. These alloys, therefore, are less susceptible to weld decay than the corresponding grades of wrought alloys, which are normally wholly austenitic. When the sections are relatively light, these partially ferritic cast alloys can be welded without suffering seriously from carbide precipitation. This advantage is especially important when weldments cannot be heat treated conveniently after welding.

Even the partially ferritic alloys will have grain-boundary carbides present when the sections are so thick that cooling rates through the 1,600 to 800 F temperature range would be very slow. To avoid susceptibility to intergranular corrosion, such castings must either be made of the stabilized CF-8C alloy, or they must be given the quench-annealing heat treatment after welding is completed. The presence of columbium in the CF-8C type offers protection against intergranular corrosion because carbon combines with columbium rather than with chromium when the alloy is heated to 1,200 F. Hence there are no areas of chromium depletion. However, the present scarcity of columbium has made it necessary for the National Production Author-

No. 5 (see page 58)



No. 6

CN-7MCu

ity to restrict the use of columbium-containing alloys to essentially military and defense applications.

Welding Characteristics

Chromium-nickel alloy castings can be welded satisfactorily, and the resultant joints will exhibit substantially the same physical and mechanical properties as the base metal. Preparation of these castings for welding is less involved than for the straight-chromium grades (discussed in Part I) since preheating is seldom required. The welds as made are normally strong and ductile, but post-weld heat treatment is necessary to restore uniform corrosion resistance and to relieve internal stresses. The heat conductivity of these alloys is only one-third that of plain steel and their coefficient of expansion is about 50% greater. The low conductivity means that heat is retained in local areas for considerable time. The high coefficient of expansion means that higher residual stresses and more warpage or distortion may be expected.

Electrical resistance of chromium-nickel castings is as much as six times the resistance of carbon steel. Furthermore, the melting points of the alloys are one hundred or more degrees lower. The combination of greater resistance, lower melting point permits these alloys to be arc welded with lower currents than are used for carbon steel. See Table VI.

Processes and Techniques

About 60% of all welding of chromium-nickel corrosion-resistant castings is done by the manual metal-arc method. The inert-gas metal-arc method now accounts for about 35% and is used where high production and large quantities are required. Inert-gas welding with a tungsten electrode is preferred on thin sections where the weld joint is not over ⅛ in.; this process and all other welding methods accounts for the remaining 5% of welded castings.

Oxyacetylene welding is practically never used on chromium-nickel castings intended for corrosion-resistant service. The reason is the danger of carbon pick-up from the flame. Gas welding, however, has its use in the welding of chromium-nickel castings of the heat-resistant type, to be discussed in Part III.

Direct current is most commonly used for welding the chromium-nickel alloys, and reverse polarity is recommended. Alternating current can also be used. Good control can be achieved by maintaining a short arc with as low a current as possible.

Table VI lists recommended electrical settings for the arc welding of corrosion-resistant chromium-nickel cast alloys of different thicknesses. These figures are characteristic of general practice only; exact settings should be determined by experience and experiments with the particular type of job. In general, about 10% less than the current that would be used for plain carbon steels is a good place to start the experiments. For semiautomatic and automatic welding, the settings of Table VI may be increased according to specific conditions.

The preferred position for welding high-alloy castings is flat. It is worth the trouble to arrange for welds to be made in the flat position. If vertical welding is unavoidable, the current should be reduced slightly. Proper preparation of joints before welding is important. Furthermore, the surfaces to be welded should be well cleaned and free of grease or dirt. Any contamination of the weld might result in carbon pick-up, with the harmful effects already discussed. Weaving should not be employed as it has a tendency to give a porous and cracked weld. A good rule to remember is that the molten puddle should never be more than 2½ times as wide as the diameter of the welding electrode.

What Electrodes?

Electrodes should be carefully selected. All elements desired in the weld deposit should be present in the core wire and in the core wire only. Tests should be performed to make certain that: (1) no vital elements are present in the coating and (2) to see whether or not any elements are lost in depositing the molten metal.

The electrode selected to weld a corrosion-resistant cast alloy should contain at least the same alloy content as the casting. It might even be higher since there will be a loss of some elements by the action of the arc. Let us say, for instance, that the electrode has the composition: 19% Cr, 9% Ni, 1.25% Cb, 3.5% Mo, 0.03% P and 0.08% C. When it is used to weld an austenitic alloy such as CF-8C, 5 to 10% of the chromium and approximately one-third of the columbium contained in the electrode will be lost. The drop from 19% to 17% or 18% chromium may not appear to be much but even this small loss could be enough to affect the corrosion resistance of the casting.

When the parent metal is extreme-

ly low in carbon, the weld deposit should be likewise. It must have the same or even lower carbon content. In electrodes for corrosion-resistant service, carbon content of the core wire is usually held down to 0.05 or 0.06%.

The coating on the d-c electrode can be either lime or titania. The line coating is characterized by a large arc puddle that appears to be hot. The slag, though somewhat mobile in a molten state, freezes quickly. The titania coating is characterized by a small, restricted arc puddle, which does not show a slag inner face with the arc action. Lime-coated electrodes are usually preferred for corrosion-resistant alloys. They give better weld puddle protection than the titania, although the latter yield an easier-to-remove slag.

Postweld Heat Treatment

Whether heat treatment after welding is required or not will depend on four factors: (*a*) the alloy composition, (*b*) the section thicknesses, (*c*) the corrosive conditions the castings will meet in service and (*d*) the magnitude of residual stresses. Mechanical properties are not generally impaired by the welding operation so only the effect on corrosion resistance need be considered.

No postweld heat treatment, other than a possible stress relieving, is required for castings of type CF-8C, the columbium - stabilized grade. Welding of other chromium-nickel grades also can be accomplished successfully without later heat treatment, provided that the castings will not be exposed to highly corrosive solutions. This is particularly true for the molybedenum-containing CF-8M alloy and the high-chromium CF-30, CH-20 and CK-20 types.

When thick sections are involved or where maximum corrosion resistance is required, castings should be heat treated after welding. Postweld heat treatment for ten alloys are given in Table VII.

Copper-Containing Alloys

High-nickel alloys with copper, CN-7MCu and CT-7MCu, are more resistant to certain highly corrosive agents than the chromium-predominant alloy types. They have sufficient chromium to provide adequate oxidizing resistance, and the additional amounts of nickel, molybdenum and copper make them suitable to withstand sulphuric acid and other reducing media. For these nickel-predominant alloys, welding procedures are approximately the same as those for the chromium-predominant alloys. However, some special considerations should be observed.

Because of the actively corrosive conditions encountered by castings made of these alloys, it is highly desirable to have the composition of the weld metal similar to that of the copper-bearing base metal. The customary stainless electrodes of wrought types 304, 310, etc., should not be employed.

The weld metal of highly alloyed stainless materials such as CN-7MCu is frequently susceptible to cracking. In particular, restraint joints and heavy sections (common in pump castings) need considerable care. The following welding instructions are recommended:

1. Use low welding currents and a short arc. For 1/8, 5/32 and 3/16 in. electrodes, the current should not exceed 90, 125 and 160 amp, respectively.

2. Preheat the casting at about 400 F to minimize cracking in the initial bead. (This is the only preweld heat treatment specified in Table VII.) Preheating is more important for highly restrained sections; less important if there is only slight restraint.

3. Use stringer beads rather than weaving.

4. Allow sufficient time between passes for the heat of the previous bead to be dissipated by conduction into the base material. The temperature in the vicinity of the weld should preferably drop to about 300 to 400 F before the next bead is deposited.

5. Chip out any crater cracks in a deposited bead before the next bead is laid. The final crater may be eliminated by running the last bead out onto the base metal and then chipping off the build-up.

* * *

Again, arc welding is the preferred method. If high restraint causes cracking to occur in the weld deposit and the cracking cannot be overcome by careful control of the welding procedures, try a welding electrode that produces a partially ferritic deposit.

When maximum corrosion resistance is desired in these copper-bearing alloys, a final annealing heat treatment is generally recommended. Heat between 1,950 and 2,050 F and follow with water quenching. Caution: warping may result from this treatment.

The third article of this series, to appear in an early issue, will tell you how to weld the heat-resistant or "H" group of cast alloys. These are also divided into chromium-predominant and nickel-predominant types and are designed to withstand service temperatures of 1200 F and over.

How Big Is a Billion Dollars?

Suppose you had a billion dollars. Let's assume that it is all in cold cash and none of it invested so that you draw no interest from it. You like to live handsomely and spend your capital at the rate of $1,000 every week. How long will it take to come to the end of your billion dollars?

Let's think it out:

A billion is one thousand million. If you spend a thousand dollars a week, it will take a million weeks to spend a billion. That sounds like a long period of time. Just how long is it?

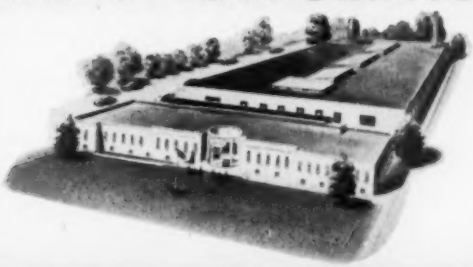
Allowing 52 weeks to a year (not quite exact), one thousand weeks is equivalent to 19.23 years. A million weeks is a thousand times that or 19,230 years. Obviously, it will take quite a while to come to the end of your resources.

Suppose that you decide to step up your rate of spending. If you spend $1,000 a day on every day including the extra one in leap years, it will take you 2,738 years to spend a billion dollars. If you had been born in the year 785 B.C.—nearly 300 years before the Battle of Marathon at the dawn of Greek civilization—you would just now be coming to the bottom of your pile.

That's how big a billion dollars is. Now how big is our federal government debt? As of January 1, 1953, it was 267 times a billion dollars or nearly $1,670 for every man, woman and child in the United States—160,000,000 of them.

EUTECTIC WELDING ALLOYS CORPORATION

$2000



PRIZE COMPETITION FOR CONTRIBUTIONS TO THE SCIENCE AND ART OF "NON-FUSION" WELDING, BRAZING AND SOLDERING

Rules:

OPEN TO:
Engineers, Metallurgists, Research Investigators, Welders, Students, Faculty Members and all others qualified.

Covering technological and research aspects, procedures and applications of the use of lower melting (lower than parent) filler metals in the non-fusion welding processes.

The Jury and Committee of Awards:

1. Dr. Robert Humphrey, former Vice Chairman, American Society for Metals
2. Prof. Otto H. Henry, Dept. of Metallurgy, Polytechnic Institute of Brooklyn
3. Dr. Th. I. Leston, Vice President, Eutectic Welding Alloys Corporation

ELIGIBILITY

1. The Prize Contest is open to single individuals or groups of two or more, except employees of the Eutectic Welding Alloys Corporation, its subsidiaries and affiliates, its Advertising Agencies and its Distributors.

2. Each paper submitted must be original and previously unpublished. Moreover, each contestant must have actively participated in the work and preparation of the subject matter of the manuscript.

3. Participation necessitates submission of a paper of not less than 1,000 words, exclusive of drawings, specifications, tables, photographs, etc.

SUBJECT MATTER

1. The subject matter shall pertain to one of the following:

Classification A—*Basic principles, theory and results of research* in the field of "non-fusion" welding, brazing or soldering. (The metallurgical considerations of these processes may include Surface Alloying, diffusion, wetting, spreading, fluxing, equilibrium and non-equilibrium reactions, solidification, etc.)

Classification B—*Practical welding applications*—(The manuscript may be based upon the design or redesign of equipment, structures, and other products of ferrous or non-ferrous materials fabricated by "non-fusion" welding, brazing or soldering. Technical advantages of these processes and savings in material and labor should be considered and substantiated. Improvements in brazing and soldering techniques might also be the subject of the manuscript.)

2. Photographs, drawings, charts or test data which will add clarity to the presentation should be included.

SUBMISSION

1. Manuscripts should be typed in English, double spaced on 8½" x 11" white paper, with any drawing and photographs on separate sheets, preferably attached to the text. The manuscript should be securely bound and have a protecting cover.

2. Papers must be submitted in duplicate. One copy must be signed by the author (or authors) and enclosed in a separate sealed envelope, with the following information on the cover sheet (1st page) of the manuscript and on the outside of the envelope:

Name
Address
Signature
Company (or University) affiliation
Classification ("A" or "B") under which paper is submitted.

A duplicate of the paper, unsigned and unidentified as to author and application, should be enclosed in a second envelope.

The two envelopes should be placed in a large envelope and mailed to The Secretary, Prize Competition, Eutectic Welding Alloys Corporation, 172nd Street and Northern Boulevard, Flushing 58, New York, N. Y.

This procedure insures that all manuscripts are treated confidentially by the Jury. After the unidentified papers have been judged, the identification with the original paper on file with the secretary will be made and the prizes will be paid to the winners.

JUDGING

The papers will be judged by the Jury and Committee of Awards. In classification "A" the primary considerations are (1) originality, (2) understanding of basic principles, (3) merit of research results, (4) clarity of illustrations and data presented. In classification "B" the primary considerations are (1) originality, (2) material and labor savings, (3) improvement in efficiency and service life and (4) design and welding procedures.

Decision of the judges will be final. All entries and ideas become the property of The Eutectic Welding Alloys Corporation, and none will be returned.

CONTEST DEADLINE

All manuscripts have to be submitted and postmarked no later than August 31, 1953. Winners of awards will be notified approximately within (60) days after the close of the competition.

All communications and questions should be addressed to The Secretary, Prize Competition, Eutectic Welding Alloys Corporation, 172nd Street and Northern Boulevard, Flushing 58, New York.

Helpful suggestions on the preparation of the paper and on possible topics are available and will be sent upon request.

AWARDS

CLASSIFICATION A: Basic Principles, Theory and Results of Research		CLASSIFICATION B: Practical Welding Applications	
First Prize	$500	First Prize	$200
Second Prize	300	2 Second Prizes, each	100
Third Prize	200	3 Third Prizes, each	50
3 Fourth Prizes, each	100		
3 Fifth Prizes, each	50		

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WE-5

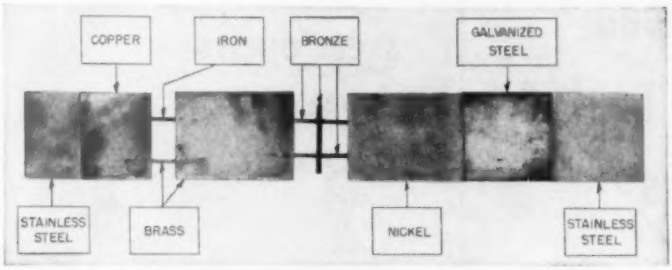
A WELDOR'S WOES

BARE STINGERS ARE ALWAYS DANDY AROUND RADIATORS AND BRAKE LINES.
NO, THAT WELDING LEAD DOESN'T HAVE HANDS, SON. IT'S ONLY YOUR IMAGINATION, EVEN THOUGH IT IS GRABBY.
"HOW" DEPT. THIS MONTH - LOCATING THAT HOLE IN YOUR GLOVE
1. PUT ON YOUR GLOVES
2. HUNT UP A PIECE OF NICE, HOT, STEEL
3. GRAB THE HOT STEEL - CONGRATULATIONS! YOU'VE FOUND THE HOLE!
"PORTRAIT OF A JERK"
HE NEEDS A PIECE OF PLATE 2 BY 2 IN. SO, DOES HE GO TO THE SCRAP PILE?? NOOO, HE CUTS A FULL SHEET, NATCH!
SEND US YOUR PEEVES, WELDOR c/o THE WELDING ENGINEER 520 N. MICHIGAN CHICAGO 11, ILL.
PUZZLE:
WHEN YOU WELD FARM MACHINERY, WHAT IS THAT "CERTAIN SOMETHING" THAT YOU NEVER DETECT ON OTHER JOBS?
FRANK TABOR

NEW G-E SYNCHRONOUS WELDING CONTROL

FOR DIFFICULT WELDS

such as these hard-to-weld metals joined by resistance welding

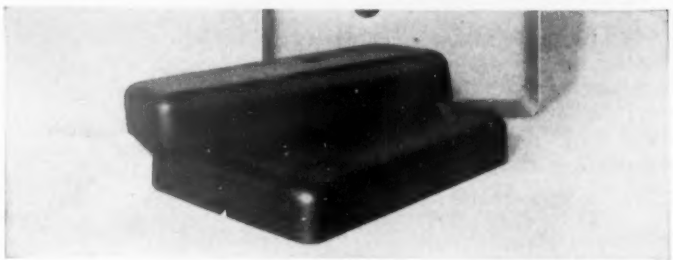


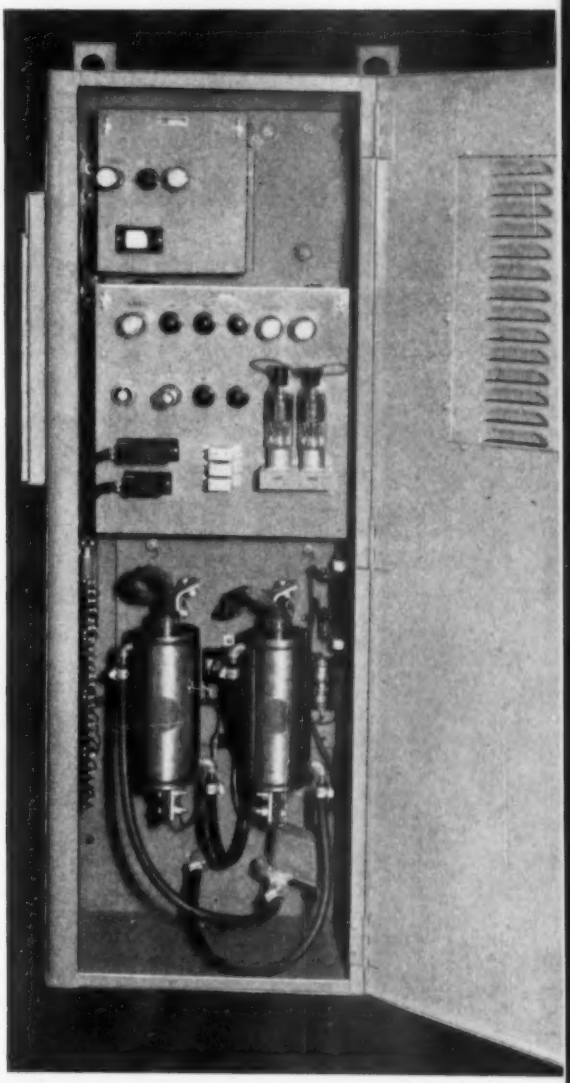
OF HIGH QUALITY

like these welded pieces of aluminum, bent 45° without cracking

AND GOOD APPEARANCE

such as the smooth, welded corners on the relay enclosures





This new G-E synchronous-precision welding control has only *one moving part*, a relay which operates the solenoid valve. There are *no relays* at all in the sequencing control. This means fewer parts to wear out, lower maintenance, and more consistent welding.

By controlling every variable involved in resistance welding except resistance, this new panel gives closer control over weld quality. By providing close current and timing control, it effects real savings in material and time, fewer rejects.

This control is available in both 600 and 1200 ampere frames, for all types of welding machines. Simple plug connections will change the control from one kind of welding to another.

The new synchronous-precision controls are part of General Electric's complete line of resistance welding controls. For further information, contact your nearest G-E Apparatus Sales Office or your welding machine manufacturer.

RESISTANCE WELDING CONTROL

GENERAL ELECTRIC

Section D785-2, General Electric Company, Schenectady 5, New York
Please send the following:

☐ GEA-5816 "The Story of Resistance Welding," a new bulletin describing the fundamentals of resistance welding and the basic types of control.

☐ GEA-5945 "Synchronous-Precision Control for Resistance Welding," a new bulletin describing the complete line of G-E synchronous controls.

NAME ..... **TITLE** .....

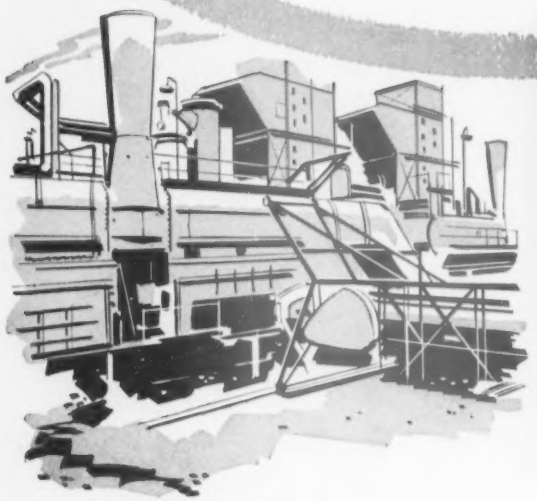
COMPANY .....

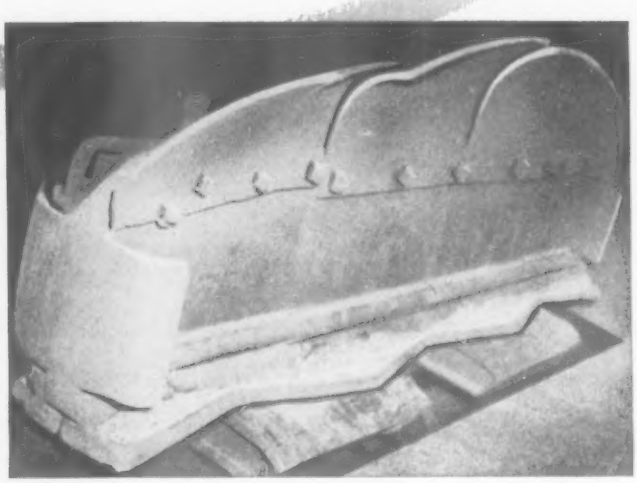
ADDRESS .....

CITY ..... **STATE** .....

These Hard-Faced Coke Pusher Shoes Lasted Over Two Years

STEEL SHOES WORE OUT IN TWO MONTHS





Riding over the coke-covered floor of an oven wears out plain steel pusher shoes in only two months. Hard-faced shoes have lasted at least two years, despite the severe abrasion, heat, thermal shock, and erosion involved in operation. With minor repairs, the hard-faced shoes can be used for another two or three years.

HAYNES STELLITE No. 1 hard-facing rod was selected to protect these shoes because it is hard enough to resist abrasion from the coke particles and the lining of the oven floor. It does not chip or spall under the thermal shock of returning from 1800 deg. F. in the oven to atmospheric temperatures.

There is a complete line of HAYNES hard-facing materials to choose from. Each is particularly suited to combat certain conditions of wear, heat, corrosion, or erosion. For a quick summary of the properties and forms of the various HAYNES rods, write for "HAYNES Hard-Facing Materials Data."

HAYNES TRADE-MARK *alloys*

"Haynes" and "Haynes Stellite" are trade-marks of Union Carbide and Carbon Corporation.

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Sales Offices
Chicago — Cleveland — Detroit — Houston
Los Angeles — New York — San Francisco — Tulsa

What It Costs to Raise Prices

BY W. F. SCHAPHORST, M. E.

As World War II neared its end, plans were made by various government bureaus and by private companies to do things "differently." Prices were to be reduced; wages were to be increased; there was to be no inflation, and all nations would live happily together in an idealistic One World. No use going over the sad story of what actually happened.

This writer was one of those who believed that prices would be reduced. In fact, he was so certain of it that he wrote an article, "The High Cost of Cutting Prices," pointing out the pitfalls that lay in the path of price cuts. A wholly unnecessary warning because, as we all know, prices were increased instead of being reduced and have gone right on increasing.

Now many welding contractors and welding distributors are worrying about the danger of steadily raising prices. Sooner or later, they feel, increased prices will cause the business volume to drop. One prominent company wrote to the author: "We saw your article on cutting prices. Is it as hazardous to raise prices as it is to reduce them?"

No. Speaking purely from the shortsighted individual viewpoint, it is not as hazardous to raise prices as it is to cut them. From the viewpoint of national welfare as a whole, it is a different story. You are helping to promote inflation by keeping alive the vicious spiral of higher prices, higher wages. This is what we have been suffering from ever since the end of the war. To get back to the shortsighted individual viewpoint, however, what happens when you cut prices is shown in Table I.

Suppose that you are now making a profit of 33 1/3%. Table I says how much you must increase your volume to "make up" the loss due to price cuts:

TABLE I

Reduce price by	Increase volume by
5%	25%
10%	67%
12½%	100%
15%	150%

It looks serious from the very beginning. Cut your prices a mere 10%, and you will have to increase volume 67%, assuming, of course, that your costs and overhead remain the same. To maintain your profit position when you cut prices 15%, you will have to boost your volume 150%. Not so easy to do.

Now let's see how the loss of volume will affect you when you raise prices. This time your profit (based upon cost) is 30% at the beginning. Table II tells you how much you will have to increase that percentage of profit to realize the same dollar profits as business goes down. Once again, your costs are supposed to remain constant.

TABLE II

For a loss in volume of	Your profit must be
10%	34%
20%	40%
30%	49%
40%	62%
50%	85%
60%	136%
70%	333%

Note that the increases in your profit percentage are not at all serious in the early stages of reduced volume. If the reduced volume is 10%, you merely step up the percentage from 30 to 34%, which doesn't constitute much of an increase in prices. Even when the volume is reduced by 20%, you can make up for it by stepping up the profit percentage from 30% to 40%. That isn't so bad either. But conditions become worse rapidly if your volume continues to sink. When the volume goes down 40%, your profit must be 62% (more than double the original 30%) if you are to realize the same number of dollars. Such a drastic price raise would probably create "squawks" from your customers and might cause a still further falling off in volume, resulting in the downward spiral so familiar to us from the Great Depression.

You will have to be your own judge as to just how far you can go in raising prices. Table II won't be an accurate guide to you because it is based on an initial profit percentage of 30%. If you want to know how the figures in Table II were computed, then study Table III. In the arithmetical example, the original profit is 30% and the new profit is 34%, realizing the first line of Table II. Once you know how it's done, you can easily substitute your own figures.

When you have studied the method and worked out the arithmetic given in the example on the right of Table III, try this problem:

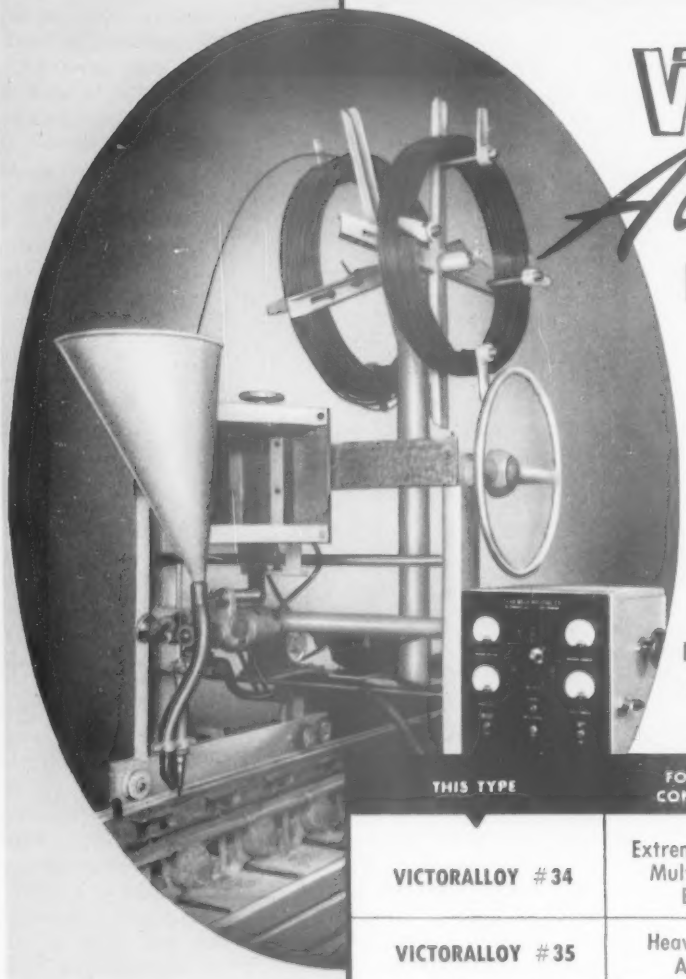
Your normal profit is 50% and your reduced volume is 20%. What must your profit be on the remaining 80% of volume?

To four decimal places, the answer is 71.43%. Did you work it out correctly? If you did, then you know how to apply the method to your own business figures.

TABLE III

The Method	A Problem Worked Out
A. What was your profit before your volume was reduced? If it was 30%, put it down as 0.30 in the column at the right	0.30
B. Add 1 to A	1 + 0.30 = 1.30
C. What is the reduction in your volume? If it is 10%, put it down as 0.10	0.10
D. Multiply B by C	1.30 × 0.10 = 0.13
E. Subtract D from 1	1 − 0.13 = 0.87
F. Divide A by E	0.30 ÷ 0.87 = 0.34

Victor presents...



VICTORALLOY *Automatic!*

HARD-FACING ROD

•

UNIFORM SIZE, SUPER-CLOSE DIMENSIONAL TOLERANCE

•

SUITABLE FOR ALL AUTOMATIC HEADS

•

"HANDI-PACKED" IN 100 LB., WATERPROOF-WRAPPED COILS

•

FIVE DIFFERENT ALLOYS . . . A TYPE TO MEET *YOUR* REQUIREMENTS EXACTLY!

THIS TYPE	FOR THESE CONDITIONS	ON THIS KIND OF EQUIPMENT
VICTORALLOY #34	Extreme Abrasion, Multiple Layer Buildup	Tractor Rails, Crane Wheels, General Buildup.
VICTORALLOY #35	Heavy Impact, Abrasion	Tractor Rollers, Idlers, Mine Car Wheels, Sheave Wheels.
VICTORALLOY #170	Abrasion, Medium Impact	Crusher Rolls, Crushers, Gyratory Crushers.
VICTORALLOY #300	Abrasion, Light Impact	Mill Guides, Crushers, Dredge Bushings.
VICTORTUBE #60	Extreme Abrasion	Tool Joints, Grader Blades, Scraper Blades, Augers.

For better welding equipment and supplies, look for VICTOR dealer sign. New dealer inquiries invited.

VICTOR for welding

Victor Hard Facing Alloys are also available for manual arc welding, AC or DC, and for gas welding.

VICTOR EQUIPMENT COMPANY H3

3821 Santa Fe Ave. LOS ANGELES 58 | 844 Folsom Street SAN FRANCISCO 7 | 1312 W. Lake St. CHICAGO 7

This joint must carry water at 500°F and 1600 p.s.i.

RADIOGRAPHY says the weld's sound

To gain top efficiency, modern power plants are operating at higher pressures and higher temperatures—conditions which call for utmost dependability in the welded joints of the piping.

Here radiography is invaluable; it alone can prove the soundness of the welds.

In this way radiography has opened new fields to welders. In high pressure piping, in the manufacture of pressure vessels, and in other applications where welding was once banned, it is now an accepted procedure.

Radiography can help you build business as well as earn a reputation for highly satisfactory work.

If you would like to know more about what it can do for you, talk it over with your x-ray dealer.

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.

Radiography . . .

another important function of photography

Kodak
TRADE MARK

on the job

Nelson Stud Welding photo

SIMPLE fixture rapidly positions studs for water heater coil plate—part of a new home heating plant

Ryan Aeronautical Co. photo

IT'S CLEANER up in the air! And welders for inert-gas welding no longer occupy valuable floor space

Home Fires Kept Burning

(Top left photo)

A COMPLETE plant for domestic radiant heating requires a floor space of only 25 by 30 in. and can be installed in the kitchen. The oil-fired boiler is camouflaged beneath a stainless-steel table top 36 in. high. Within the white casing are all the controls and components needed for: (1) forced hot-water radiant heating and (2) an adequate supply of domestic hot water. Boiler has an output of 90,000 Btu per hour for home heat plus 12,00 Btu per hour for heating water.

These compact heating plants are being used extensively in Levittown, Long Island, and exclusively in Levittown, Pa. In the Long Island Levittown, which saw its first house in 1947, some 11,670 homes are now equipped with the convenient boilers. In Levittown, Pa., a former corn field, 4,000 homes were built during the first year, each of which is equipped with a "Table-Topper" heating plant.

The "Table-Topper" is manufactured by York-Shipley, Inc., York, Pa. Fabrication of its domestic hot water coil has been greatly speeded by a semiautomatic stud-welding process. Stud welding is 10 to 12% faster than the former method of drilling and tapping for stud installation.

The hot water coil is assembled to the boiler in such a way that it can be easily removed for cleaning and maintenance. Studs fasten the water coil to the coil plate. Twelve ½-in. studs are installed on each coil plate. These studs must be able to resist countless thermal cycles.

The accompanying picture shows the simple fixture that insures the rapid, accurate positioning of studs on the coil plate. The fixture has a depressed lower section so that it can fit in only one position over the coil plate. As soon as the fixture has been positioned, a wing nut is tightened to prevent movement between the plate and template during welding. Ferrules to receive the studs are placed in holes in the fixture, and the operator runs down the line with the welding gun. The circles surrounding the ferrule holes (see picture) tell the operator where to place the feet of the welding gun in order to insure proper alignment between the plate, ferrule and stud. A 400-amp generator supplies the power for welding, and a timer controls the weld cycle automatically.

* * *

Resurfacing Drill Collars

AT C & W MACHINE Works, Great Bend, Kans., dual submerged-arc welding heads are being used to reclaim drill collars in about one-half the time formerly required. The added speed has doubled the capacity of the installation and has made it unnecessary to purchase another jig or to provide added space.

The two heads, mounted on a single carriage, deposit a layer of tough, work-hardening steel on the cylindrical collar. A multiple-bead technique is used. The distance between the two electrodes is so adjusted that after one revolution the bead from the second electrode is laid down beside that from the first. By making three passes, one complete layer of metal is deposited on the collar.

Welding conditions are rather critical, according to Linde Air Products Co. The collars are rotated one rpm and the speed of travel is 2⅝ ipm. These values are chosen so that the total number of beads will just fit the circumference of the collar. The current applied to each welding head is 350 amp at 28 to 30 volts.

* * *

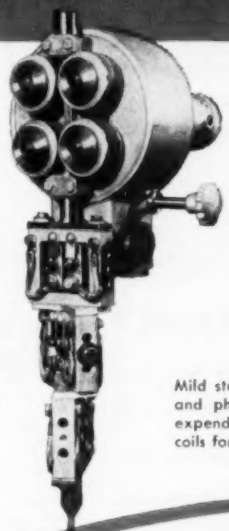
More Overhead

(Top right photo)

TO SAVE badly needed floor space, the Ryan Aeronautical Co., San Diego, Calif., decided to reposition its arc welders. The machines, which were formerly located on the floor near welding booths, were placed on overhead platforms. Besides saving space, the shift lessens the possibility of damage to the welders from dirt and foreign materials.

The overhead welders serve 29 booths for inert-gas welding of aircraft manifolds. Additional booths are planned for oxyacetylene welding and for carbon-arc welding.

Every Welding Need

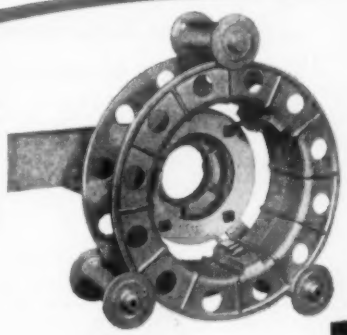


The Reid-Avery type 4R automatic head and control originally designed for Raco composite type A, may be used with equal success for lightly coated open arc or for submerged arc welding.

Raco composite type A heavy coated automatic (open arc) electrodes, a "Reid-Avery" first, can be furnished for all mild steel, low alloy high tensile, low hydrogen, hard surfacing and stainless steel grades.

Mild steel, alloy steel, stainless steel, aluminum and phosphor bronze wire are available on expendable wooden spools or in layer wound coils for gas shielded arc welding.

The Raco "free wheeling" reels are especially designed for high speed automatic machines. The ball bearing trunnions enclose the coil so there is no over-run or loose strands and larger coils can be used. Changing coils is a matter of only a few seconds and no tools are required. Available in 12, 14, 25 and 36 inch sizes, for any weight from 50 to 200 lbs.

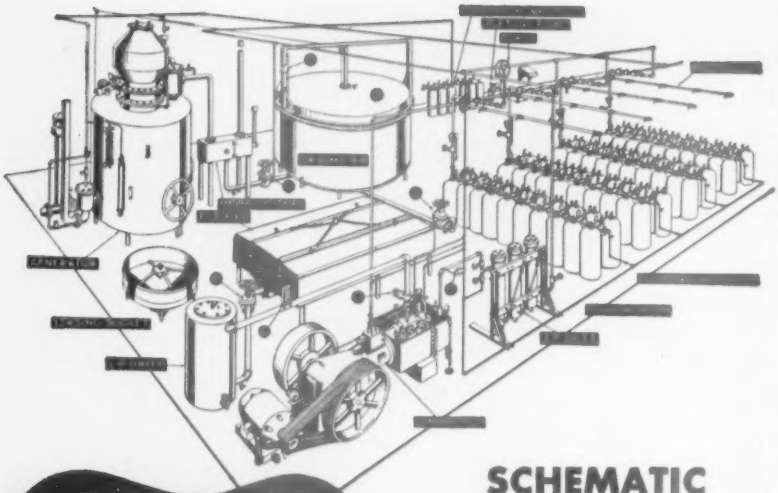


The Raco coils of wire for submerged arc welding have long been known for their uniform high quality and convenient, easy to handle package. Special attention is paid to the accurate weight, lay and temper of the wire so that the wire will accurately follow a seam. Available in mild steel, alloy steel and stainless steel.

Since 1919 Reid-Avery Company has specialized in the manufacture of all types of welding electrodes and wire. The large modern plant in Baltimore is equipped for wire drawing, annealing, pickling, coating, cutting, winding and packaging. Every phase of welding electrode and wire production is completely controlled from start to finish. You can be assured of uniform high quality and the best possible deliveries.

We also manufacture a complete line of manual electrodes in the following grades:
Raco Mild Steel, Raco Low Alloy High Tensile, Racocast for nonmachinable welds on cast iron, Raco Feral for welding aluminized sheets, Raco Low Hydrogen, Raco Hard Surfacing, Racolloy Stainless, Racolloy Nickel and Nickel 60 for machinable welds on cast iron.

The REID-AVERY COMPANY
INCORPORATED
DUNDALK • BALTIMORE 22 • MARYLAND
SINCE 1919 PRODUCERS OF ARC WELDING ELECTRODES AND WELDING RODS



A *Low Pressure*
ACETYLENE
PRODUCING
PLANT
that Charges up to
160 CYLINDERS
at ONE TIME

SCHEMATIC PLANT ASSEMBLY

SHOWING LOCATION OF UNITS THAT MAKE UP THE PLANT

This plant layout provides simplest operation at low production costs. Compact design allows operator to watch all operations at all times.

LOW PRESSURE

GENERATOR

This 600-lb. acetylene generator fits into the above plant assembly. It stands out as one of the safest plants manufactured. Automatic controls minimize operating personnel. Rated capacity of the generator and plant assembly is 2700 cu. ft. per hour. The other units are designed for maximum production at minimum costs.

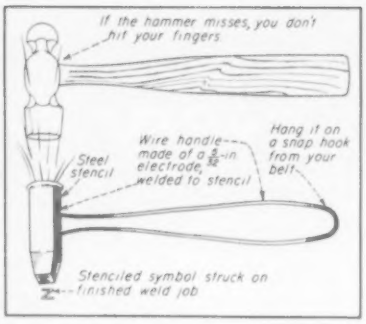
WE INVITE YOUR INQUIRIES

INDEPENDENT ENGINEERING COMPANY, Inc.

CONSULTING · RESEARCH · DESIGNING

Manufacturers of
CYLINDERS AND GAS PRODUCING EQUIPMENT
ACETYLENE · OXYGEN · HYDROGEN · NITROGEN

O'FALLON 5, ILLINOIS


If the hammer misses, you don't hit your fingers
Steel stencil
Wire handle made of a 5/32-in. electrode, welded to stencil
Hang it on a snap hook from your belt
Stenciled symbol struck on finished weld job

Saves Mashed Fingers

by Andrew Vena

IN MY WORK—defense welding—Army ordnance requires every weldor to identify his welds with a mark. A symbol is assigned exclusively to him, and he must stamp it on his finished welds with a steel die or stencil. The stencil is struck a smart blow with a hammer.

If you miss the stencil, you may smash your fingers. To avert this hazard, a number of arc welders at my shop have made wire handles for our stencils from stripped 5/32-in. electrodes. Such a handle is easily welded to the stencil. Then, if your hammer should miss its mark, you won't cripple your hand.

The looped handle makes it easy to carry the stencil on a snap hook at your belt. If you carry it in your pocket, its sharp burrs will cut a hole in the pocket through which it may be lost. There is a charge of $5 for a new stencil. If you do lose it, it's much easier to find when a handle is attached and less likely to be swept up with the shop floor trash.

* * *

5-Minute Salvage Job

INSTEAD of welding to build up the mismachined areas of crankshafts, a large automotive manufacturer is now using metallizing. The salvage operation formerly took at least an hour per crankshaft. Now it requires only 5 to 10 minutes per shaft.

Preparation of the overmachined surfaces to receive the sprayed metal is very simple, according to Metalizing Engineering Co., Inc., Long Island City, N. Y. The freshly machined parts require only a "shoe shine" with a strip of emery cloth. The high-molybdenum metallizing wire is said to provide a harder surface than the original shaft material. Since the deposit is only about 0.025 in., finishing to exact dimensions is done quickly; finishing, in fact, takes about a tenth of the time that was required after build-up by welding.

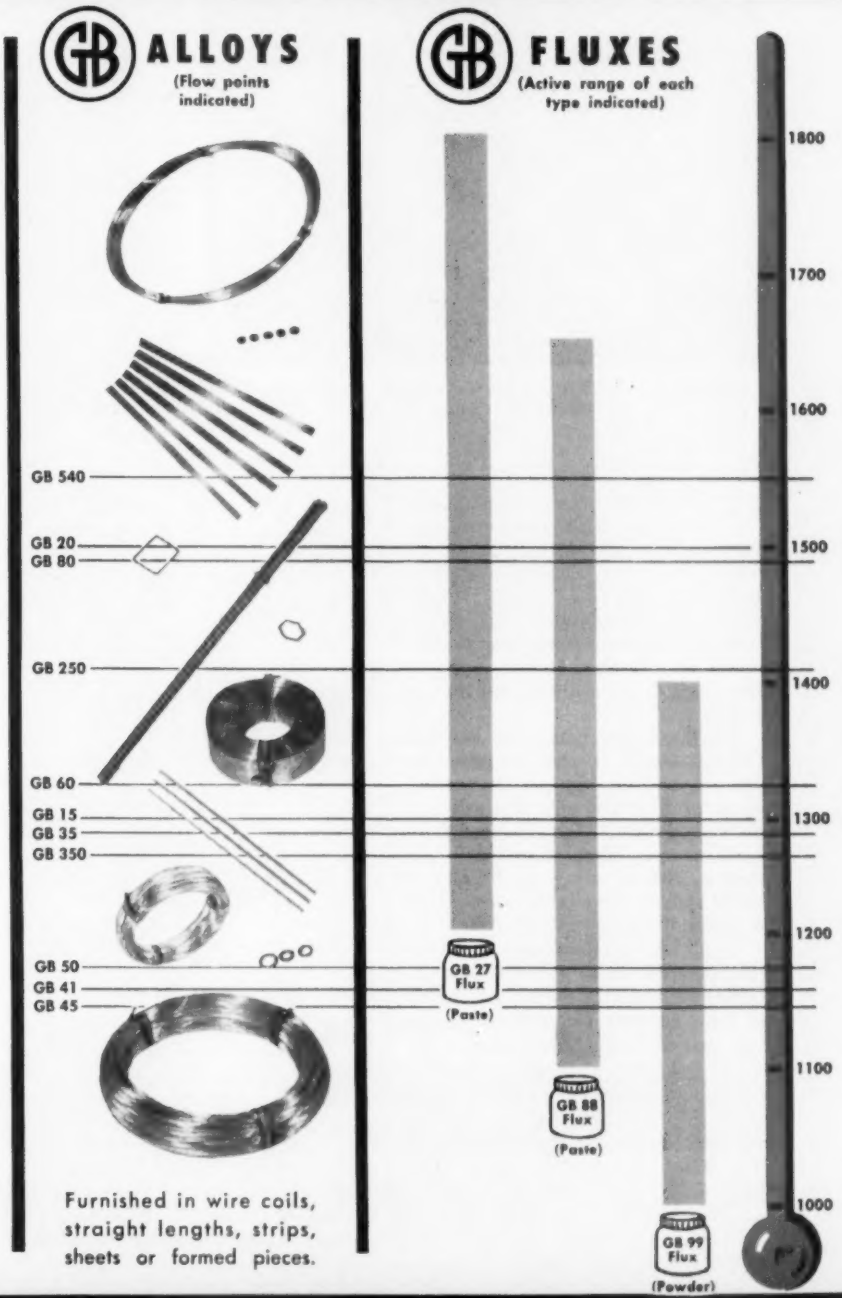
FACTS ABOUT GB BRAZING ALLOYS AND FLUXES . . .

YOU BE THE JUDGE!

There is one sure way for you to learn just how GB Alloys and GB Fluxes team together to give maximum results on low temperature brazing applications—that is; try them in your own shop and on your own specific jobs.

Yes, here's the reason why we say, "You Be The Judge!"—try GB Alloys and Fluxes on a no-cost, no-obligation basis. Simply write to Goldsmith Bros., Silver Brazing Division, 5841 So. Throop St., Chicago 36, Ill. We will notify your nearest GB Distributor that you want "working" samples. In addition to furnishing samples, your GB Distributor is always available to give you competent assistance in the practical applications of low temperature silver brazing.

GB 22 Flux is a high temperature brazing flux with an active range of 1200°F to 2000°F. Exceptionally fine powder makes up into a smooth paste when mixed with water. Low glare and non-fuming at any heat.



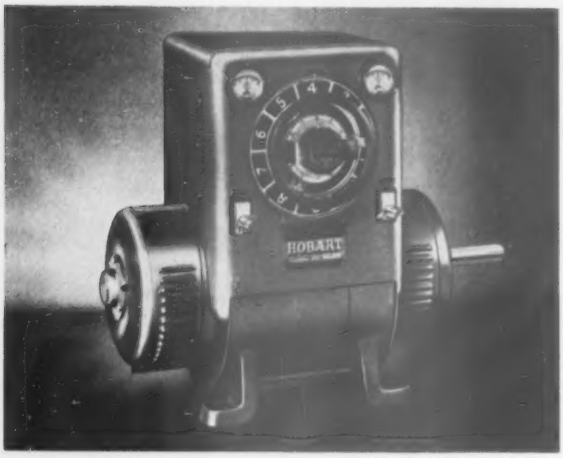
Furnished in wire coils, straight lengths, strips, sheets or formed pieces.

Free! **GB Samples**

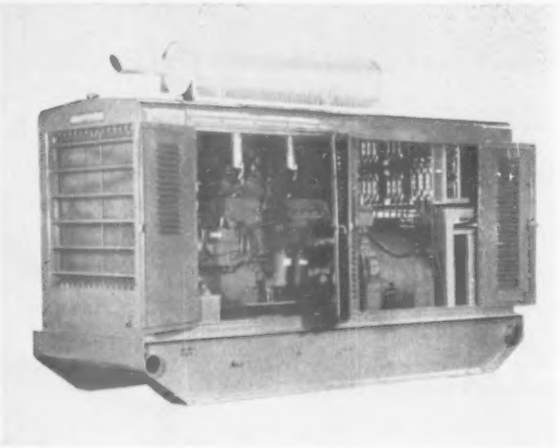
Don't fail to "Judge For Yourself". Write for the name of your nearest GB Distributor for liberal samples.

GOLDSMITH BROS.
SMELTING AND REFINING CO.
Silver Brazing Division
5841 SOUTH THROOP STREET CHICAGO 36, ILL.

New Products . . .



BUILD-YOUR-OWN Hobart d-c welders can be fitted to gas, motor or belt-drives. Choice of 200 or 300 amp



SEVEN WELDERS can be powered by new Diesel-generator for top efficiency in fuel costs and maintenance

New D-C Welders

251 DIRECT-current welding generators without motors are now available through Hobart Bros. This "Build Your Own" line of welding generators (less motor) is made exclusively for direct coupling to the customer's gasoline engine, electric motor or belt drive from a motor or line shaft to form a low cost d-c arc welder.

Rated at 200 amp, the Bantam-Champ model is recommended for general welding. It has a welding range of 40 to 250 amp and will handle as large as 3/16-in. electrodes for continuous welding. It requires a gas engine with a rating of 20 bhp at 2,200 rpm or an electric motor with a rating of 10 hp at 2,200 rpm.

The 300-amp model has a range extending over 40 to 400 amp and includes an auxiliary power outlet plug of 1 kw capacity for operating lights and power tools. Most suitable for the job shop weldor, this equipment requires a gas engine with a rating of 50 bhp at 1,800 rpm or a 20 hp electric motor operating at 1,800 rpm.

HOBART BROS. Co., Dept. WG, Troy, O.

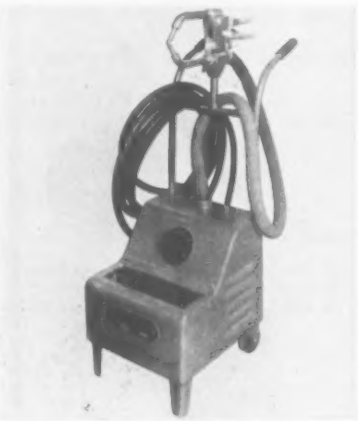
* * *

Fire Extinguishers

252 A NEW line of portable carbon dioxide fire extinguishers is known as "Fyre-Freez". The new portables feature squeeze-type valves and come in five sizes, 2½, 5, 10, 15 and 20 lb models. Normal hand pressure actuates the extinguisher after the safety pin has been removed. Recharging is easy too.

WALTER KIDDE & Co., INC., 697 Main St., Belleville 9, N. J.

* * *



Portable Gun Welder

253 A NEW portable gun welder is completely water-cooled from tip to transformer. A solenoid contactor has replaced the magnetic contactor in former models. The aluminum castings on the gun have been redesigned for higher cooling and operating efficiency. Timer-equipped, the welder is rated at 10 kva.

REX WELDER AND ENGINEERING Co., 409 Southwest Blvd., Kansas City 8, Mo.

INFO-AID CARDS

on pages 33-34 filled out with item numbers of products catching your eye, will bring you additional information about them.

Diesel For 7 Welders

254 A NEW Diesel-engine generator improves the efficiency of large-scale arc welding operations in tank or structural work in the field. The "Ready Power" 100-kw generator provides for simultaneous operation of seven welders and can also power a 50-hp electric air compressor plus a drop-cord line for operation of power tools and emergency lights.

Principal advantages it offers are 1) centralization of power source in a single unit for simplified control and maintenance 2) ability to maintain welding efficiency at long distances from the power source and 3) portability of the rectifier, which can be easily moved during construction to eliminate any need for elevation of the power source.

Designated Model RD24A12, it is powered by an International Harvester Diesel. Its structural steel base has high ground clearance and a wide skid for maximum mobility and flotation over rough or soft terrain. Housing is weatherproof.

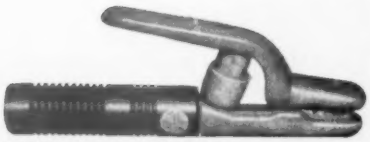
THE READY POWER Co., 3826 Grand River, Detroit, Mich.

* * *

E-7010 Electrode

255 A NEW all-position electrode for d-c reverse polarity operation is claimed to give high tensile strength deposits on low alloy steels. It conforms to AWS E-7010 classification. Other features are said to be deep penetration, easy handling and better appearance.

SHOBER WELDING ELECTRODES, 900 W. Weber Ave., Stockton, Calif.



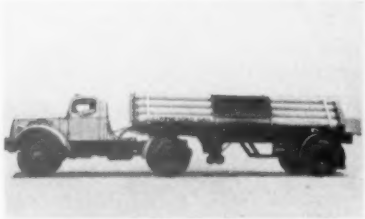
250-Amp Holder

256 NEW 250-amp electrode holder Model AW-C takes electrodes ranging from 1/16-in. through 7/32-in. Cables through No. 1 size can be clamped in place; cables through size 1/0 can be soldered or brazed.

Though its weight is only 19 oz. the holder utilizes the same 98% copper alloy said to give other Jackson holders high strength, hardness and conductivity. Jaw insulators are made of a new thermosetting material.

JACKSON PRODUCTS, Warren, Mich.

* * *



Gas Transport Assembly

257 A NEW service to producers and shippers of high pressure gases in bulk provides completely assembled gas transports that meet I.C.C. specifications and any particular state road limitations. 30-tube transports for oxygen have a capacity of 45,000 cu ft; for hydrogen, 40,000 cu ft and for nitrogen, 39,000 cu ft. Other size transports for other gases are also available.

TAYLOR-WHARTON IRON AND STEEL Co., Cylinder Div., Dept. 4, Cincinnati 12, O.

* * *

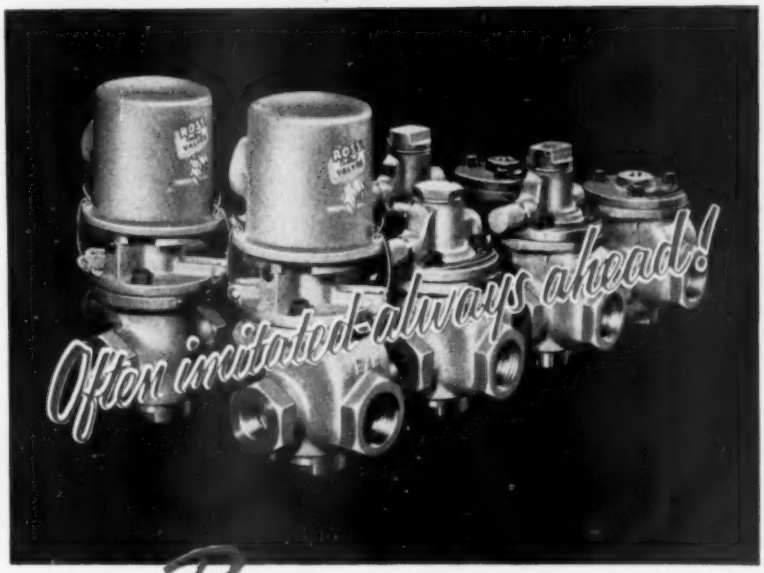
High-Heat Flux

258 EXTRA penetration and protection are claimed for a new flux for high temperature brazing and hard soldering of ferrous and nonferrous metals. Called "Kwikflux No. 94", its patented phosphate formula gives "extra bite" and better capillary action in long, deep joints. It is unconditionally guaranteed to work with all standard silver, brass, bronze and other hard solders with torch, furnace, and induction heating. Free working samples are available on request. State type of work, alloys used and type of heat.

SPECIAL CHEMICALS CORP., 30 Irving Place, New York City 3.

* * *

IF IT'S A VALVE
FOR WELDING—
ROSS HAS IT



Ross In-line Valves

The reputation and performance of Ross In-line Series Valves are so outstanding that imitations are constantly being attempted. Through constant improvements, the Ross In-line Series remains the leader and the envy of the trade. Here's why—

☆ *Dependable*—10 to 20 million maintenance-free cycles, and many more tens of millions of life-cycles, are not uncommon.

☆ *Speedy*—split second operation; oversized exhaust.

☆ *Low current consumption for solenoid models*—inrush of 1.2 amps @ 110/60.

☆ *Positive seal*—poppet construction; Hycar seats.

☆ *Easy maintenance*—only a few moving parts; can be disassembled without breaking line connections — solenoids readily accessible.

☆ *Many modifications*—vacuum, air, and liquid service; various pressures; available for AC or DC solenoids or air actuation with or without sequence timing; interchangeable heads.

Write for full information on the Ross In-line Series

Ross OPERATING VALVE COMPANY

116 E. GOLDEN GATE AVENUE • DETROIT 3, MICHIGAN

Engineers at Your Service in all Principal Cities

Hose Repair Kit

259 ALL types of hose between ¼-in. and 1-in. ID, regardless of ply, can be fixed with the "Sav-A-Hose" maintenance kit. A specially-designed hose clamp tool is used to form a wire band around the hose, then tighten and clamp it. It is said to provide a neat clamp with no bulky obtrusions. It is said to make a permanent connection that is rustproof and will withstand pressures up to 500 psi.

The "Sav-A-Hose" Kit comes with one hose band tool and 20 bands each of sizes ¼, ½, ¾ and 1-in. ID hose. Kits are available through welding equipment distributors, mill supply houses and hardware stores.

SQUIRE-COGSWELL CO., 4140 N. Kedzie Ave., Chicago 18.

* * *

Build-Up Electrode

260 NEW electrode called Stoody "Build-Up" was developed to provide the exact properties necessary in a material for rebuilding carbon steel and alloy steel parts. These are a sound deposit, high tensile strength, toughness and resistance to cold flowing. As an underbase for a hardfacing overlay, the "Build-Up" is recommended for such parts as drive sprockets, churn drills, shovel drive tumblers and house rolls, tractor rollers and idlers, tool joint shoulders and clutch jaws.

The "Build-Up" is an extruded alloy-coated electrode gives a deposit having a hardness of 29-31 Rockwell C under normal conditions.

STOODY CO., Whittier, Calif.

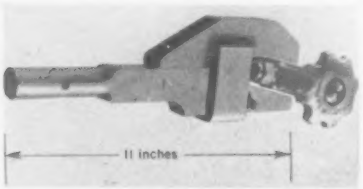
* * *

Aluminum Electrode

261 COATED aluminum electrodes of 2S and 43S grades have extruded coatings that are non-hygroscopic. Recommended for d-c reverse polarity operation, they are said to have a quiet and stable arc. Slag is easy to remove and the bead has an attractive appearance, says the company.

WELDWIRE CO., INC., N. W. corner Emerald & Hagert Sts., Philadelphia 25.

* * *

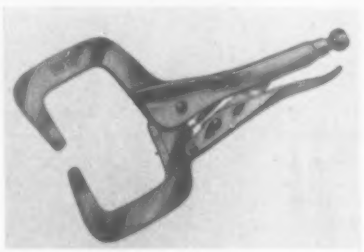


Cylinder Valve Wrench

262 A NEW valving wrench was designed specifically for insertion of valves in cylinders. It is made of tough steel that is case hardened. The handle can be fitted with either of two jaws, one adjustable from 15/16 to 1 3/16 in. the other from 1 3/16 to 1 7/16 in. It is necessary to attach a 1-in. steel pipe extension to the wrench. Length of the extension governs the amount of torque applied. With a 60-in. extension about 300 ft lb of torque is available.

SUPERIOR VALVE & FITTINGS CO., West Liberty Ave., Pittsburgh 26.

* * *



Toggle C-Clamp

263 A NEW toggle-type C-clamp with extra reach and rapid locking action has an adjusting end screw for pre-setting the jaw opening to work size. Large working spaces between the "Vise-Grip" jaw arms enable the user to clamp difficult jobs with ease. Pre-setting of jaws allows the operator to position the work with one hand and lock it with the other.

PETERSEN MFG. CO., DeWitt, Nebr.

* * *

Fire Extinguisher

264 NEWEST line of Alfco portable carbon dioxide fire extinguishers includes models of 2½, 5, 10, 15 and 20 lb capacity. Advantages of the new line include increased simplicity, fast operation, removable siphon tube, safety disc side-mounted and a double-prong locking pin to prevent its falling out during transport.

AMERICAN LAFRANCE-FOAMITE CORP., Elmira, N. Y.

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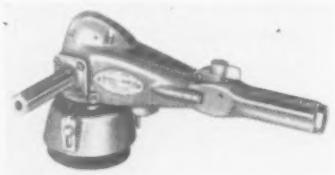

Gearless Angle Grinder

265 No gears are used in a new air-powered, direct drive angle grinder for snagging welds, surface grinding and cut-off jobs. Speed at 90 psi is 6,000 rpm. Called the Model 2FA-60, it has two types of dead handles, one straight, the other 30-deg off straight. Handles may be attached to either side and the angle dead handle may be rotated to any of four positions for corner grinding or for left-handed operators. Exhaust deflector directs exhaust away from the operator.

INGERSOLL-RAND CO., 11 Broadway, New York City 4.

* * *

Paint-On Solder

266 HIGH speeds of application are claimed for a new paint-on solder paste combined with flux. Named "Eutec-TinWeld", it can also be used as a tinning compound in paste form.

Basically, "TinWeld" consists of a specially formulated lead-tin-solder that is premixed, in paste form, in proper proportions with its special flux. The resultant product is said to yield a capillary flow similar to silver solder with strengths equivalent to conventional lead-tin solders. Whatever small amount of flux residue may result from the "TinWeld" paste can be swiftly and easily washed off with water. It can be applied with brush, spatula or by dipping, so it can be fitted into furnace operations handily.

EUTECTIC WELDING ALLOYS CORP., Flushing, N. Y.

(More New Products on page 91)

IT'S YOURS...FREE!

This NEW catalog helps you choose the *right* COATED ABRASIVE for every job!

30 HELPFUL PAGES...covering

METALWORKING: *Hand and machine operations.* Portable, disc sanding; contact wheel, platen, and slack-of-belt grinding; wet grinding; miscellaneous metalworking products; "MX" discs and depressed center wheels.

GLASS AND OTHER NON-METALLIC MATERIALS

WOODWORKING: *Hand and machine sanding and finishing;* oscillating, flat belt, edge, turning, moulding, drum and disc sanders; Vonnegut brush-backed sander heads; portable belt machines.

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GRINDING ATTACHMENTS: The "61" Port-A-Belt.

PLUS a section giving machine manufacturers, model numbers and their belt sizes.

Here's a real guide to coated abrasives for you. Makes it easy to select belts, discs, or cut sheets for any machine or hand abrasive operation—on metals, non-metallics, or wood.

The recommendations given are *complete*—including grain sizes and types, backings, coatings, product sizes, prices and packaging information. In addition, a special section tells who manufactures the machines used in most grinding or sanding operations, and the machine model numbers with their belt sizes.

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NEWS . . . . . *from page 6*

SEAMLESS nickel tubing is placed in mold for spot welding yoke. Tubing carries cooling water to electrode

40 YEARS as president of Victor Equipment Co. was recently celebrated by Ludwig Stettner (second from left)

Pure Nickel Tubes Cool Spot Welding Yokes

ELECTRODE tips on spot welders withstand terrific heats but only because they're supplied a lot of cooling water. The "water boy" in many spot-welding yokes is ⅜-in. OD nickel tubing made by Superior Tube Co., Norristown, Pa. A big producer of spot-welding yokes is the Philadelphia Bronze & Brass Corp., Philadelphia.

One of Philadelphia Bronze's designs (shown in the above picture) utilizes two lengths of nickel tubing, ⅜ in. OD by ¼ in. ID. These convey water to and from the end of the yoke where the electrode tip is mounted in its holder. The hollow electrode tip fits over a brass tube screwed into the end of the yoke. Water for cooling the tip flows up inside the brass tube and returns outside of it where it then enters the return nickel tube.

The body of this spot-welding yoke is chromium copper alloy, named "Mallory 3" by P. R. Mallory & Co. This alloy pours at 2,200 F. Naturally, the tubing around which the alloy is cast must successfully withstand this pouring temperature. Of equal importance, the tubing must have long resistance to large amounts of water passing through it as cleaning is difficult and time-consuming. This tubing is so ductile that workers at Philadelphia Bronze cold bend the 0.065-in. wall tubing by hand to the desired shape. When the tubing is shaped, Monel chaplets are welded to both lengths of tubing to hold them in position in the mold as shown above. The tube ends are cut off flush on finished castings.

Most resistance welding manufacturers specify either nickel or Inconel tubing inside the spot-welder yoke. Both materials are non-rusting and are unaffected by the 2,200 F pouring temperature of chromium copper. At present the Philadelphia Bronze & Brass Corp. uses fully annealed seamless nickel tubing in preference to Inconel because it is more readily available. Superior Tube Co. makes both types of tubing, as well as small tubing in 50 other analyses.

Philadelphia Bronze casts about 150 nonferrous alloys to customer specifications. Many orders call for tubing inserts and the foundry maintains stocks of nickel, Monel, Inconel and AISI type 4130 steel tubing for such jobs. No difficulty in casting around tubing has been experienced, providing correct analysis and wall thickness of tubing is specified.

* * *

Air Force Mechanics Get Solar Welding Training

FOUR technicians from McClellan Air Force Base, Sacramento, Calif., recently completed two weeks of training in inert-gas and spot welding at Solar Aircraft Co., San Diego. The training course was arranged by Solar in cooperation with the Air Materiel Command headquarters. It gives selected Air Force men an unusual opportunity to study the advanced welding techniques for which Solar is famous. A similar course is being considered for men from Hill Air Force Base in Utah and other AF installations.

Stettner and Fulwider Honored by Victor Workers

VICTOR Equipment Co., San Francisco, shared an anniversary cake with Ludwig W. Stettner, president and chairman of the board and William S. Fulwider, secretary-treasurer. The celebration marked the 40th year at the helm for Mr. Stettner and 25 years service by Mr. Fulwider, second from right in the above photo. Others in the picture are E. A. Daniels (far left), vice-president in charge of sales and E. O. Williams (far right), vice-president, Southern California district.

Mr. Stettner was presented a desk clock and pen set, mounted in marble and decorated with an inlaid gold plaque carrying his signature. Mr. Fulwider was given a jeweled watch, engraved with his signature, to mark the occasion.

* * *

Big Three Welding Opens Albuquerque Warehouse

NEWEST office and warehouse of the Big Three Welding Equipment Co., Inc. has been opened at 4322 Second St., N.W. in Albuquerque, New Mexico. A new building is being constructed in which the installation of an oxygen plant is contemplated, according to C. K. Rickel, president of the company. An acetylene plant may be added later.

The warehouse will handle all main Big Three lines of equipment including those from the Lincoln Electric Co.; Victor Equipment Co.; Schramm, Inc.; Cleco Div. of Reed Roller Bit Co.; Nelson Stud Welding Div., Gregory Industries and Worthington Corp.

Russians Claim Welding of 7-Ft Steel Sections

IMPORTANT advances in welding technology have been announced by the Ukrainian Academy of Science, including the feat of welding large hydraulic turbine components some 7-ft thick. Other work has been done on the high-speed welding of steel water pipes having diameters ranging from 13 to 46 ft.

Claimed as an advance on American techniques is a new method of double-arc welding of pipes at speeds between 390 and 525 ft per hour (78 to 105 ipm). Other new welding methods include the automatic welding of stainless steel and the welding of thick sheets of aluminum.

Members of the Ukrainian Institute on Welding are said to be touring industrial plants to demonstrate new welding techniques to technical people. For these tours they have specially equipped railroad coaches fitted with the latest welding equipment.

Regular information bulletins are published by the Institute to describe its latest findings. This year it intends to concentrate its research on automatic welding processes, with particular emphasis on assistance for the Soviet oil industry.

—McGraw-Hill World News

* * *

53,000 Visitors See Western Metal Show

CLOCKED attendance for the five-day Western Metal Exposition and Congress at Los Angeles was 53,453. Registration added up to 33,648. Success of the show and technical sessions assures repeat holdings of the Show and Exposition in Los Angeles on a two-year basis, according to William H. Eisenman, secretary of the American Society for Metals.

Timeliness and importance of Western Metal Congress sessions, presented by seven cooperating technical societies at the Hotel Statler, was attested by large audiences.

* * *

60% Welding Growth Predicted by 1958

SALES should jump more than 60% in the welding industry in the next five years, recently predicted William H. Loveman, president of Burdett Oxygen Co., Cleveland. Mr. Loveman stated that almost all metalworking processes today involve welding products of one kind or another. Sales of welding equipment in 1952 were the biggest in history, despite shortages of materials.

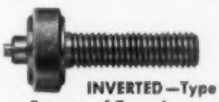
ARE YOUR PRODUCTION AND PROFITS GOING INTO THE SCRAP HEAP?

UP TO 80% OF YOUR PARTS REJECTS AND FIXTURE REWORK COSTS CAN BE ELIMINATED WITH THE

VLIER AUTOMATIC TORQUE THUMB SCREWS

AVAILABLE IN FOUR TYPES

REGULAR —Type A for normal supporting



INVERTED—Type B Reverse of Type A support

TEE HEAD—Type C used with sliding V-blocks

ADJUSTABLE—Type D set your own holding pressures

HERE'S WHY—

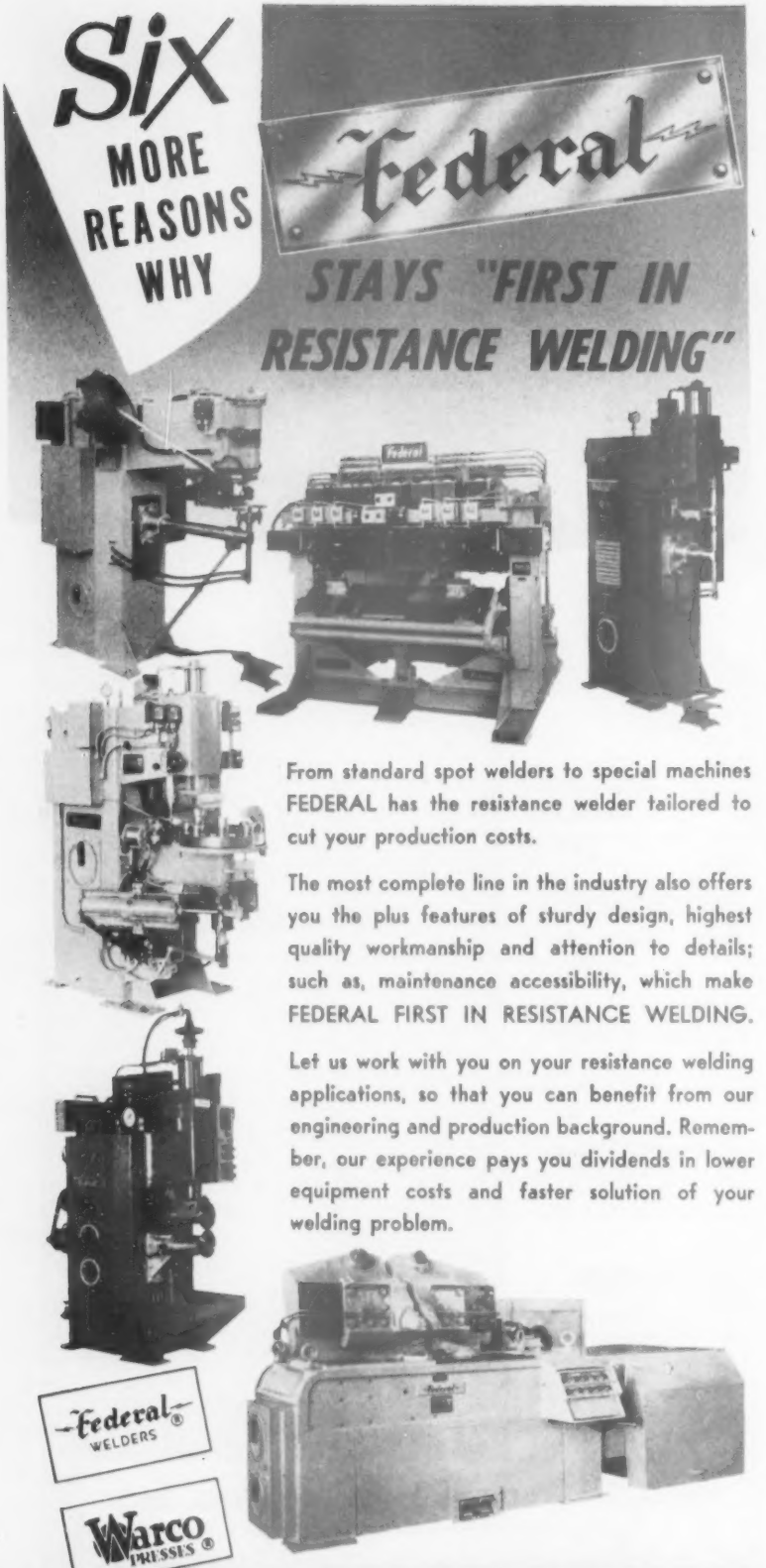
VLIER Torque Thumb Screws are simple holding tools that give controlled support for even fragile work pieces against machine tool pressures. An automatic ball check in the head prevents further tightening once a pre-determined holding pressure is reached. Thus, no distortion—no rejects. These tools are operated by finger pressure only, and work without fail in noisy, greasy or dark places because they are *automatic*. Accuracy and uniformity are guaranteed and there is nothing to wear or break. It will pay you to apply VLIER Torque Thumb Screws to your production problem.

Send for Catalog No. 61

VLIER ENGINEERING, INC.

4552 BEVERLY BLVD., LOS ANGELES 4, CALIFORNIA

Distributors of Spring Plungers, Spring Stops, Fixture Keys, Toggle Pads.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STAYS "FIRST IN
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From standard spot welders to special machines FEDERAL has the resistance welder tailored to cut your production costs.
The most complete line in the industry also offers you the plus features of sturdy design, highest quality workmanship and attention to details; such as, maintenance accessibility, which make FEDERAL FIRST IN RESISTANCE WELDING.
Let us work with you on your resistance welding applications, so that you can benefit from our engineering and production background. Remember, our experience pays you dividends in lower equipment costs and faster solution of your welding problem.
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WARREN, OHIO

Drawalloy Expands Welding Wire Output

THE Drawalloy Corp., York, Pa., a producer of stainless and tool steel wire for the welding industry has enlarged operations in its new quarters on Lincoln Highway West at Alloy St., in York.

This wire mill was established exclusively for the production of stainless steel, tool steel and special alloy wires for the welding industry. It maintains large inventories of hot rolled rod and in-process wire of special chemical analyses required for welding. Finished stocks of cut wire for gas and inert-gas welding are maintained in all grades of stainless and in five common types of tool steel: water-, oil-, air-hardening, hot work and high speed.

The company uses a new form of package protection for its products, designed to simplify handling and shelving problems. The sturdy fiber tubes contain 10 lb. of bare wire in cut lengths. Six tubes make carton-size packages of 60 lb.

President of Drawalloy is E. J. Brady, also president and founder of Alloy Rods Co., York, Pa., leading manufacturer of alloy electrodes.

* * *

Dutch High-Speed Tools Soldered and Butt Welded

SILVER soldering and butt welding processes have been added to the production line of a tool factory in the province of Sassenheim, South Holland. Not only are the new tools made in these ways able to withstand higher speeds but they are also more economical to purchase. The high-speed part of the tip and tool bits is made of high-alloy super cobalt vanadium steel. A Rockwell C hardness of 66 plus or minus one is guaranteed. The tips are silver-soldered to the shafts or to the high-speed inserts in the tool bits.

A composite tool bit consists of a square shaft, in which is incorporated a rectangular high-speed steel rod. This tool bit is very economical for shaping and finishing. Another composite profile tool bit has a hollow face over its whole length. This bit can be used for pre-turning.

The 50/50 tool bit is butt-welded: half of its length consists of shaft material and the other half high-speed steel. The tools are ground on four sides and are made in such dimensions as are uneconomical for composite tool bits. Name of the firm is N.V. J.H. Rohn, Gereedschappenfabriek, Industriekade, Sassenheim, The Netherlands.

—McGraw-Hill World News

Jim Lincoln Receives 45-Year Pin from Friends

JAMES F. LINCOLN, president of The Lincoln Electric Co., Cleveland, was recently awarded a 45-year service pin at the company's annual banquet and dance. It was slipped in his lapel by A. F. Davis, vice-president and secretary of the company.

It called to mind another pinning occasion in Mr. Davis' life. Back in 1914, "Charley" Davis was nervously waiting for an interview with Mr. Lincoln to apply for a job. Remembering that he was a fraternity brother of Mr. Lincoln, he slipped his fraternity pin from his lapel on that occasion so that the fraternity bond would not influence the interview.

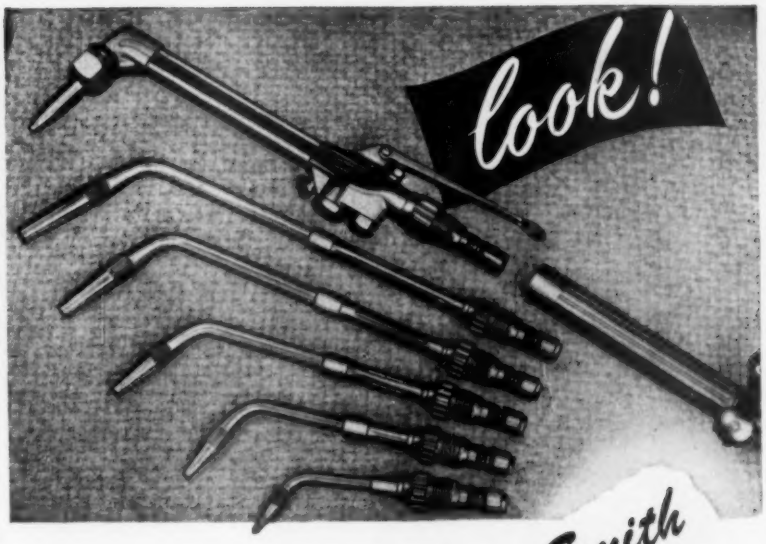
Mr. Lincoln joined the firm in 1907, then run by his older brother John C. Lincoln, who had started the enterprise in 1895 for making electric motors. Jim Lincoln assumed executive management in 1914 and began to direct the company's interests into a field just then beginning to be heard about, electric arc welding.

Some 1,000 company workers, their wives and friends gathered for the annual banquet and presentation of service awards. Pins recognizing 10 or more years of service were given to 138 Lincoln workers.

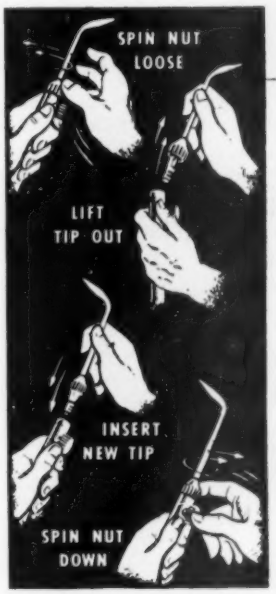
* * *

More Factory Space for De-Sta-Co Clamps

A NEW assembly plant for making toggle clamps has been put in production by Detroit Stamping Co., Detroit. Located in Birmingham, Mich., it is equipped with the newest machinery, specially designed to produce these clamps, widely used in welding, drilling, cementing, inspection and assembly operations. The main plant and offices of the company, manufacturing specialized pressed metal parts as well as finished parts, will remain at 350 Midland Ave., Detroit 3.



You can change these Smith 1 Tips in 6 Seconds



- No wrench necessary
- Fingers do the job
- Fast line-up of tip
- Fast change from welding to cutting

How do you like that for fast, efficient operation? No searching for wrenches—no wasted time. Just use fingers only. In actual demonstrations, operators have been able to remove and replace 4 tips in the time another operator could remove and replace 1 tip in an old fashioned model. And the seal stays tight even if tip is battered or nicked!

This is the kind of progress modern industry needs and wants. But it's not the only advantage you get with this new Smith equipment. Note that the Cutting Assembly can be attached just as quickly as a tip and the new "FLO-TROL" feature eliminates reverse flow of gas—prevents burned out seats. Keeps torch on the job . . . does away with costly delays. Another ingenious feature permits rotating the tip **while flame is burning!** (Heavy Duty Torch Body and Cutting Assembly, illustrated above, carries Lifelong Guarantee).

THAT'S ALL! . . . JUST *6 SECONDS;* IT'S NEW AND REVOLUTIONARY

MAIL COUPON TODAY FOR DETAILS

SMITH WELDING EQUIPMENT CORPORATION

Manufacturers of fine Welding Equipment for over 40 Years

Smith Welding Equipment Corporation
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Please send me more information on the time-saving and money-saving features of your new torch.

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AN AIR REDUCTION PRODUCT

For Welding and Cutting . . .

NATIONAL CARBIDE

in the red drum

HIGHEST QUALITY
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Write for the name and address of the NATIONAL CARBIDE supplier nearest you.

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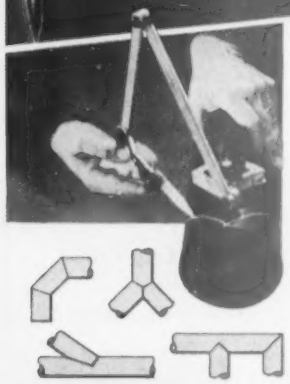
LAY OUT PIPE JOINTS
in minutes!



SAVE TIME AND MONEY!

A SMOOTH SWING of the Contour Marker's soapstone point and you're ready to cut! It's easy and *absolutely accurate* because there is an angle dial calibrated in both degrees and pitch. Any of the pipe joint angles shown can be marked off in minutes. And you save "man hours" as well as oxygen and acetylene gas because "cut and try" methods are completely eliminated. Two sizes are available complete with adapter for marking structural steel. Standard, for pipes from 1½" to 18" dia.; Jumbo, for pipes from 16" to 48" dia. Instruction book included. Belt case available. Write for information.

CONTOUR MARKER CORPORATION OF CALIFORNIA
1843 E. Compton Blvd., Compton, California • NEwmark 1-9474

THE CONTOUR MARKER

U.S. Will Buy 100,000,000 Lb From Canadian Nickel Producer

OUR nickel supplies will be substantially more as a result of a contract signed recently between the Defense Materials Procurement Agency and Falconbridge Nickel Mines, Ltd., Toronto, Canada.

Falconbridge will sell the U. S. Government 100,000,000 lbs of nickel by mid-1962, beginning with delivery of 2,000,000 lb this year. During this period, the government will also buy an additional 50,000,000 lb if the company decides to offer the metal. The government has an option to buy 50,000,000 lbs of nickel between 1962 and 1967. There's a possibility, therefore, that the total nickel take will be 200,000,000 lbs by 1967.

Price of the nickel to 1962 will be at market plus amortization allowance for Falconbridge's $42,000,000 new investment. After 1962, purchases will be at the market price.

Also involved in the deal are purchases of 2,000,000 lbs of cobalt by mid-1962 and 52,000,000 lbs of copper by 1959.

* * *

New Ryan Building Made For Efficient Welding

A self-contained welding building has been put in operation at Ryan Aeronautical Co., San Diego, Calif. The most modern of its kind, the building provides 29 inert-gas welding booths having good ventilation, lighting and convenient working conditions.

Ray Ortiz, Ryan manifold superintendent, and Bill Kupilik, general welding foreman suggested the idea of the new metal sash and saw-tooth structure. The 29 150-amp motor-generator welders supplying the booths are mounted on a long overhead platform about 7 ft high. The platform is made of welded steel frames and wood and is located at the back of each booth.

Ryan-designed automatic timers relieve the weldors of the responsibility of controlling the flows of argon gas and water to their holders. Remote foot controls permit them to change welding heat without touching the weldor. Moving the welders off the floor has removed air turbulence problems in the booths that caused considerable wastage of argon.

A cascade system provides all booths with a supply of argon and two booths with oxygen and acetylene. Argon is piped from a central storage facility. Ryan says its bill for argon last year ran to $192,000, making it one of the largest users in the country.

Welded Steel Tube Buildings at British Industries Fair

BUILDINGS made from welded steel tubing were on display at the British Industries Fair, Birmingham, England, April 27 to May 8. Made by Ludwell & Co., Ltd., Coventry, they go under the name "Pandex" multiple buildings.

Applications for these structures have been in light industry and in agriculture for piggeries, byres, corn dryers and poultry houses. Some have been used to build soccer viewing stands. The standard portal arches are said to be fitted together easily by unskilled workmen. Sheeting rails are also made of tubing and screw together to lock the arches into a rigid frame. Concrete is poured around stanchions after assembly. For covering the framework, both asbestos and corrugated steel sheets are attached with hook bolts.

Easy to transport, an 1,100 sq ft building complete with sheeting and a pair of double doors will go on a 6-ton truck. A modified type of arch has just been developed which greatly reduces the cubic capacity for export shipping space. The firm claims that two men can erect one of the latter 40 by 60 structures in two days.

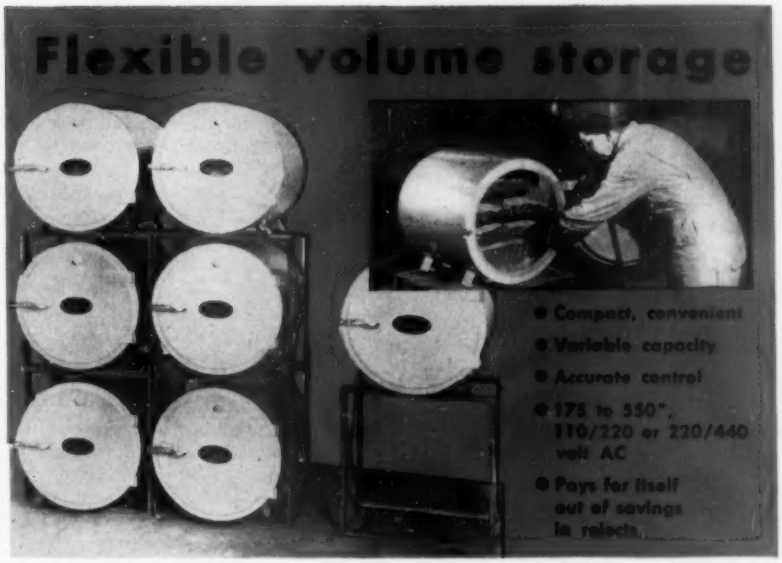
Until now most of the tube welding has been carried out at the factory. Now, however, experimental work is going forward with site welding fabrication. With site welding it is possible to weld the purlins direct to the trusses, to effect a saving in both labor and fittings. At present, Ludwell makes the trusses and purlins as separate items at the factory. Lugs are welded to the trusses so that at the site purlins can be bolted to them.

Recently the firm shipped the complete stage for an open-air theatre to Jamaica. Depth of the stage was 40 ft, width of the theatre and proscenium 55 ft and height 21 ft. Ludwell's own new factory at Leamington utilizes a welded tubular framework measuring 40 by 60 ft.

* * *

Canadian Cable Firm Bough By English Company

BRITISH Insulated Callender's Cables Ltd. announce that they have acquired the cable and wire business of Phillips Electrical Works Ltd., Canada. They will form a new Canadian company, Phillips Electrical Company (1953) Ltd., to carry on the business as a going concern at the existing Brockville, Ont., and Montreal factories. Present personnel of the purchased company will be retained.


Flexible volume storage
• Compact, convenient
• Variable capacity
• Accurate control
• 175 to 550°, 110/220 or 220/440 volt AC
• Pays for itself out of savings in rejects

of low-hydrogen type rods with

DryRod electrode oven and stand

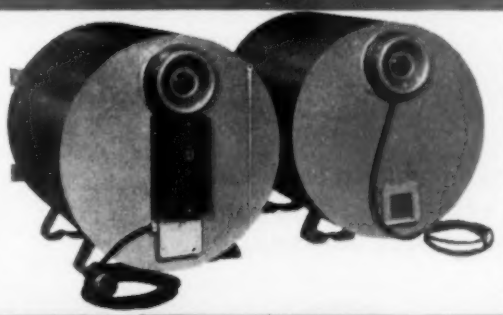
Volume storage of various low-hydrogen type electrodes is "a snap" with the new DryRod method. Designed for the special needs of high-strength welding, Phoenix's type 300 DryRod Electrode Oven and Stand provide *flexible point-of-use storage at low cost.* Nine 350-lb. capacity ovens occupy only 15 sq. ft. of floor space . . . give safe, convenient storage for 1½ tons of different type rods, with their varying temperature needs. Single bank of ovens, with Stand, is 2' wide, 29½" long. 3-deep tier, 5'11" high, is well within reach of average welder.

The popular DryRod system also permits changeable oven groupings at low cost. It's easy to add, subtract, or move units to new areas as desired. So play safe. Preserve moisture-sensitive rods . . . protect the quality of your welds with DryRod — the shop-proved Electrode Oven with the exclusive circular design. See your welding supplier, or write direct for free bulletin.

DryRod—Trademark X-DR-7

Completely wired, ready for use

DryRod is available in 110/220V or 220/440V (AC). Either type comes completely wired, ready to plug in. Saves time and expense of rewiring for heavier voltage. No separate transformer required. 840 watt heater.



Phoenix Products Co.

Milwaukee 16 Wisconsin

DryRod Electrode Oven

Ask to see *DryRod* at your welding supply dealer

WRITE FOR FULL INFORMATION

Phoenix Products Co. X-DR-7
4715 N. 27th St., Milwaukee 16, Wis.

☐ Send new bulletin DR-752 explaining how DryRod can save me money on high-strength welds

☐ Send chart showing recommended temperatures for various mineral-coated electrodes

Name .....

Company .....

Address .....

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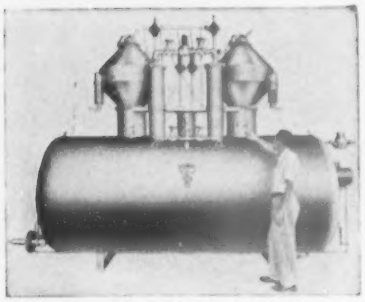
MODERNIZE YOUR PLANT WITH A SIGHT FEED MODEL A-TWIN ACETYLENE GENERATOR



- Acetylene may be produced continuously, without necessity for shutting down operations at recharging periods.
- Safety is built into the Model A-Twin. Units are listed by U.L. and approved by F.M.
- Saves you up to 50% or more of the cost of cylinder acetylene; 10% to 30% over conventional type single hopper type generators. Operation is simple.
- Available in five convenient sizes to meet requirements for acetylene in your plant.

SEE YOUR WELDING SUPPLY DEALER OR WRITE TODAY FOR FULL INFORMATION

WELDING Sight Feed EQUIPMENT

THE SIGHT FEED GENERATOR COMPANY
55 EAST THIRD STREET
WEST ALEXANDRIA, OHIO, U.S.A.
Manufacturers of Welding Equipment for more than 25 years

Air Products Builds Allentown, Pa., Laboratory

GROUND was recently broken near Allentown, Pa., for the first building of a new research laboratory for Air Products, Inc. Eventually, six units will be built. Director of research at Air Products is Dr. Otto J. Stern.

The company manufactures oxygen-nitrogen generators and equipment employing extremely low temperatures used in the chemical and petroleum industries. It has industrial gas manufacturing plants in Iselin, N. J., Parkersburg, W. Va. and Walkerton, Ind., and is planning construction of another in Chicago. In addition, it owns the K-G Equipment Co., manufacturer and distributor of welding and cutting equipment and industrial gases.

Air Products came to Emmaus, Pa., in 1946. At that time it had only about 60 people working. Today it has more than 700 employees.

* * *

Tweco Opens Branch at Harper, Kansas

TWECO Products Co., Wichita, Kansas, has just opened a new branch plant at Harper, Kansas. The new location is 50 miles southwest of Wichita, close enough to permit material and personnel transfer in an hour or so. Some 7,000 sq ft of floor space are available in the building, half which is machine shop and assembly area. Primary function of the Harper branch will be to supply parts and assemblies to the Wichita plant for final assembly and shipment.

Tweco officials point out that the move is an expansion and also an attempt to get more labor, very tight in the Wichita area. In addition, the new branch will provide a more continuous source of supply in case of fire or other mishap at either location.

* * *

"Put my oven door back! Can't you ever forget you're a welder?"

Sellstrom QUALITY EYE AND FACE Safeguards

One Piece Clear Lucite Eye Shield in 4 Sizes

Here is one of the most popular eye shields ever designed, because it offers the most ideal eye protection. Just consider these facts:

1. Extremely light weight, one-piece construction, moulded from .060 clear Lucite.
2. Offers 92½% clarity by laboratory test. This is a higher clarity than clear glass.
3. Offers wide vision, has patented rolled edges for perfect fit on the face.
4. Offered in four sizes: 39-A, 4¾" lens. 39-B, 5" lens. 39-C, 5½" lens. 39-D, 6" lens. The 5½" lens should accommodate all shell-rim prescription glasses but the 6" lens is offered for those who prefer extra roominess.

NOTE TO DEALERS: When ordering in standard dozen lots, we recommend 2 39-A, 4 39-B, 4 39-C and 2 39-D. This assortment seems most satisfactory and is based on actual requirements in industrial plants.

This eye shield is available at all of the better class dealers. If your dealer cannot supply you, write us direct.

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Offering a Variety of More Than 300 Eye and Face Safeguards
626 N. Aberdeen St. Chicago 22, Illinois

Milwaukee Technical School Celebrates 50th Year

WISCONSIN'S top industrial and business figures were scheduled to meet May 4 to pay tribute to the 50 years of service rendered by the Milwaukee School of Engineering. Known as one of the best technical schools in the country, it was organized in 1903 in the bachelor quarters of Oscar Werwath, a German-born electrical engineer.

Today, under the leadership of his son Karl, the school has an annual enrollment of some 1,500 students. Another 350 students attend evening sessions. A staff of nearly 100 administers to the students, who come from all 48 states, 24 foreign countries and three territories. Altogether, some 50,000 students have been trained in technical education since that night in 1903 when Mr. Werwath gathered his small group to talk about a school.

During the first eight years of the school's existence, the students had developed a proficiency enabling them to not only design but build much of their own electrical machinery, meters, storage batteries, switchboards, small generators and gasoline engines.

Some 18 different courses leading to college degrees or certificates are offered by MSOE. Its welding courses, started in 1934, are recognized as outstanding. They were the forerunner of the present program in metal fabrication leading to a B.S. degree in mechanical technology.

* * *

Houston Welding Exhibit Covers Entire Product Line

ADVANCE information from more than 65 exhibitors at the American Welding Society Exposition, June 16-19, indicates every welding product made will be on display. Staged in the Shamrock Hotel's Hall of Exhibits, it will be the first all-welding show ever held on a national basis.

Among products shown will be aluminum alloys and fluxes, silver brazing flux, stainless steel solder, positioners, contour and radius markers, centering heads, welding rods, electrodes, castings, miscellaneous brazing alloys, electrode holders, weld cleaning tools, magnetic partical inspection equipment, arc welders, welder caps, lighters and chains, portable industrial X-ray units, regulators and torches.

Live demonstration displays will be presented by Adams Alloy Co., All-State Welding Alloys Co., Dockson Corp., Handy and Harman, Hobart Brothers, J. M. Ragle Industries,

Time and money saved by fast repairs with Bridgeport No. 192 Low Fuming Bronze Rod

There is no time to lose when a hydraulic pump operating under 1200 pounds per square inch of pressure is out of action. This one was down because its cast iron frame had cracked and broken. The choice was to wait for a new frame or make a quick repair to restore service.

In just a few hours, braze-welding with Bridgeport No. 192 Low Fuming Bronze Rod had done the job. With the worn areas rebuilt, the pump was put back in operation. Subsequent inspections have shown the repaired sections to be stronger and less brittle than the original casting. Bridgeport No. 192 is a low fuming manganese type rod that is recommended for all-purpose welding.

Long pre-heating or extended cooling periods are not needed with braze-welding. It is only necessary that the parent metal be locally heated to a cherry red before the free flowing rod begins to "tin". The Bridgeport Booklet, "Bronze Welding Alloys" explains the complete process. Write for your copy.

BRASS Bridgeport CO.

BRIDGEPORT BRASS COMPANY
Bridgeport 2, Conn. Established 1865
Mills at Bridgeport, Conn., and Indianapolis, Ind.
In Canada: Noranda Copper and Brass Limited, Montreal

Bronze Welding Rod A PRODUCT OF **BRIDGEPORT BRASS**

CONTOUR CUTTING

Doesn't have to be a hair pulling proposition!

Yeh, Joe won the contract all right . . . the whole ding-blasted works . . . miles and miles of pipe fabrication and some of the darndest shapes to cut you ever saw! Joe lost money on that job. Oh sure, he made a profit, but he could have made more — lots more — with the H & M Shape-Cutter and Beveler. Joe didn't know it but the H & M could have saved **90% of his time** on those contour cutting problems. With the H & M Shape-Cutter all you do is attach the desired cutting pattern to the machine . . . slip the ma-

chine over the pipe and snap in place . . . light the torch . . . give the hand crank a few turns . . . and the job is done — the maximum SPEED WITH ACCURACY. Joe had a few choice words for those reject welds too . . . the H & M certainly could have saved him a lot of fuss and bother. If you're in the same fix as Joe get all the details . . .

WRITE FOR THE FREE FOLDER
"MORE PROFIT DOLLARS IN PIPE FABRICATION"

H&M PIPE BEVELING MACHINE CO.

Trade Mark Reg. U.S. Pat. Off.
311 E. 3rd. St. • Ph. 3-0241 • Tulsa, Ok.

Harrisburg Steel Buys Heckett Engineering, Inc.

PURCHASE of Heckett Engineering, Inc., Butler, Pa., was recently approved by the stockholders of Harrisburg Steel Corp., Harrisburg, Pa. The acquisition includes the wholly owned subsidiary, Heckett International, Inc.

To the present list of Harrisburg Steel products, which include high-pressure seamless steel cylinders, seamless pipe couplings, drop-forged flanges, commercial drop forgings, liquefied petroleum gas cylinders and small steel bars, is now added Heckett's operations in the handling and utilization of steel works slag and reclamation of the metal contained therein. This recovered metal is sold back to the steel companies concerned for considerably less than the prevailing market price of heavy scrap.

Heckett Engineering now operates slag reclamation facilities in 11 major steel plants of the United States and Canada, within such firms as Dominion Iron & Steel of Canada, Inland Steel Co., Newport Steel Co., Republic Steel Corp., Steel Company of Canada, United States Steel Corp. and Youngstown Sheet & Tube Co. The latest has been completed at the Fairless Works of U. S. Steel.

At the same special stockholder's meeting, E. H. Heckett was elected a director and chairman of the board of Harrisburg Steel Corp. W. K. Jones, vice-president of Heckett Engineering, and Mark W. Koch, treasurer of Leonard J. Buck, Inc., Jersey City, N. J., were elected directors. Other members of the board of Harrisburg Steel Corp. are Richard J. Buck, Charles Garside, D. M. Horner, C. L. Keister, H. M. Reeser, J. T. Simpson and Edgar Z. Wallower. Officers are Mr. Heckett, chairman of the board; J. T. Simpson, president; H. M. Reeser and D. M. Horner, vice-presidents; E. L. Martin, treasurer; Lester J. Sutton, assistant treasurer, and Clair R. March, secretary.

* * *

Tank Failures Not Due to Weld Failures

ARMY Ordnance reports from the Pentagon that tank failures in combat are not due to weld failures in the majority of instances. Mostly, failure is due to ballistic forces above the resistance of the tank armor.

When weld failures have occurred they are only partial and have had no particular bearing on the outcome of tank missions. Ordnance says these facts should answer a lot of the critics of U. S. armor-welding methods.

Tempilstik°

the amazing Crayons that tell temperatures

A simple method of controlling working temperatures in:

- WELDING
- FLAME-CUTTING
- TEMPERING
- FORGING
- CASTING
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- DRAWING
- STRAIGHTENING
- HEAT-TREATING IN GENERAL

It's this simple. Select the Tempilstik° for the working temperature you want. Mark your workpiece with it. When the Tempilstik° mark melts, the specified temperature has been reached.

$2 each

gives up to 2000 readings

Available in these temperatures (°F)

113	263	400	950	1500
125	275	450	1000	1550
138	288	500	1050	1600
150	300	550	1100	1650
163	313	600	1150	1700
175	325	650	1200	1750
188	338	700	1250	1800
200	350	750	1300	1850
213	363	800	1350	1900
225	375	850	1400	1950
238	388	900	1450	2000

Also available in pellet or liquid form.

FREE —*Tempil° "Basic Guide to Ferrous Metallurgy"* — 16¼" by 21" plastic-laminated wall chart in color. Send for sample pellets, stating temperature of interest to you.

Booth 125
Welding and Industry Exposition
Houston, Texas

Tempil° corp.
11 WEST 25th STREET
New York 10, N.Y.

Scrapping Manganese-Bronze Aided by Powder Cutting

WHEN tests were finished recently on some non-magnetic Diesel engines, it was necessary to scrap the manganese-bronze flywheels. This metal is worth about $700 per ton and about three tons of flywheels were waiting.

Heretofore, many hours and many saw blades were necessary to cut such castings ranging up to 4 in. thick. The flywheels measured 13-in. thick in some places but were quickly severed by a powder-cutting flame torch. According to Linde Air Products Co., cutting time was only half that for hand sawing of the 4-in. sections.

* * *

Sharpe & Pulaski Named by Thermacote Co.

NEW Northeastern states representative for the full line of Thermacote Co. is Sharpe & Pulaski, 16 Court St., Brooklyn, N. Y. J. F. "Joe" Sharpe and A. Q. "Quent" Pulaski have been actively engaged in selling welding equipment and accessories for the past several years and have built a good following in their area.

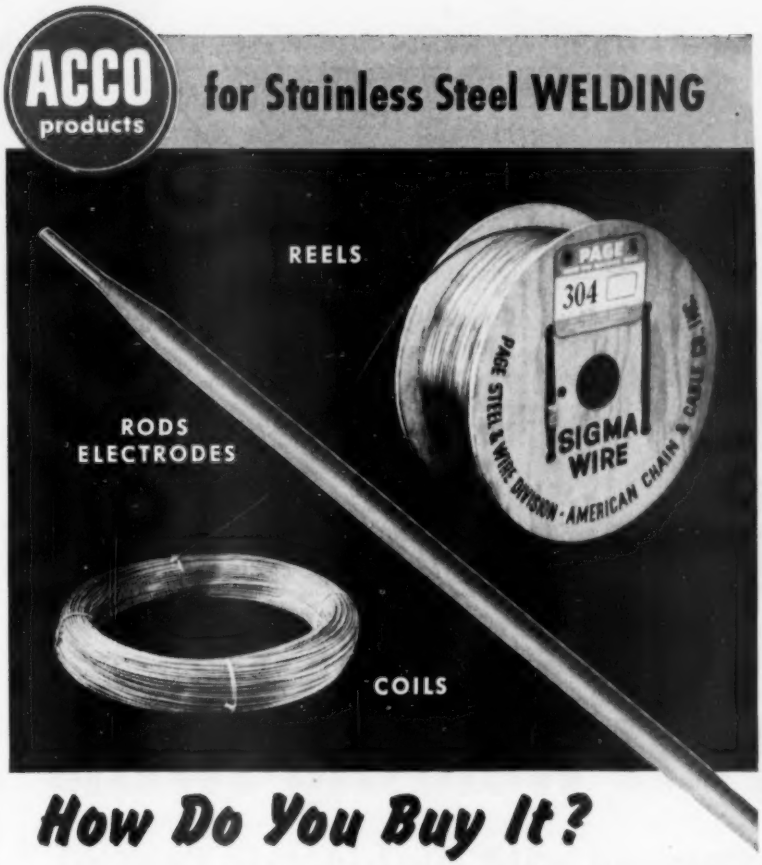
* * *

3-Day Welding Clinic Held by Steel Sales

VISITORS from all over Indiana attended the three-day welding clinic held April 15-17 by the Steel Sales Co. of Indiana at Indianapolis. A new warehouse at 2185 N. Sherman Drive was opened during the celebration.

Welding experts from leading equipment manufacturers were on hand to show the latest welding and brazing methods. Companies represented included The International Nickel Co., Aluminum Co. of America, Crucible Steel Corp., Lukens Steel Corp., American Platinum Works, P. R. Mallory, Driver-Harris, Alloy Metal Wire and Metal Forming Corp.

Practical demonstrations were given in oxyacetylene, arc, inert-gas, and other types of welding, according to Fred W. Walters, president of Steel Sales Corp.



How Do You Buy It?

• No matter how you buy stainless steel welding wire—on reels, in coils, or packages of rods or electrodes—PAGE can supply you in a variety of analyses.

AC-DC Electrodes—Gas Welding Rods

Stable burning even at lower heats. Slag is clean and easily removed. Coating resists cracking right down to short stubs. Your choice from a complete line for every type of stainless welding.

for Inert Gas Welding

Six Page-Allegheny stainless grades in .035", .045", and .0625" diameters. Precision thread-wound on 25-lb. non-returnable reels to fit popular arc welding machines.

for Submerged Arc Welding

PAGE stainless in wire diameters from 1/32" to 5/16", plain or copper coated. In layer-wound coils, 22" or 24" mill coils, or 200-lb. returnable steel reels.

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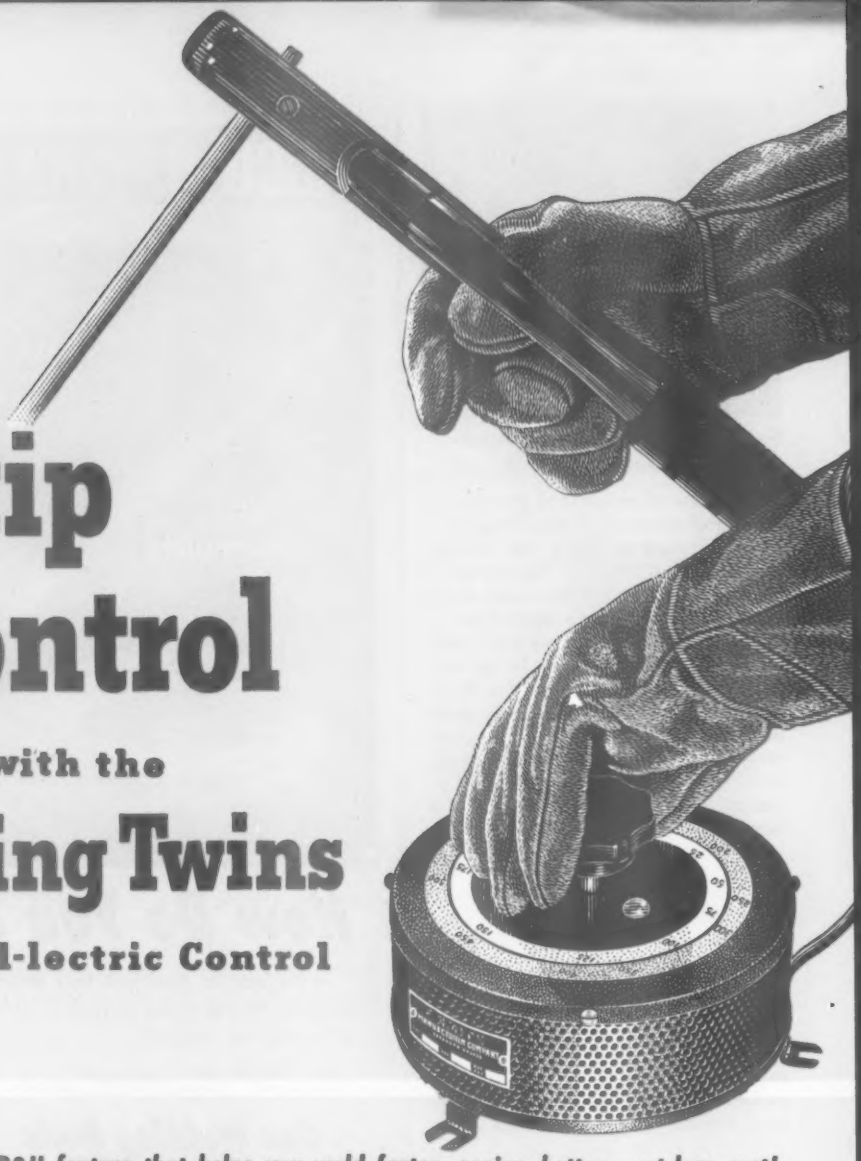
PAGE Welding Electrodes Rods Wire

Fingertip heat control

right at the work-with the

P&H Welding Twins

equipped with Dial-lectric Control



Dial-lectric Control is an exclusive P&H feature that helps you weld faster, easier, better — at less cost!

P&H AC WELDER

As easy as tuning your radio — just turn the radio-type knob of the Dial-lectric Instantaneous Remote Control (or step on a foot treadle), to adjust heat accurately. Easy, quick-start arc. No hard-working cranks to turn. No moving parts to cause delays or maintenance expense. Sizes up to 625 amps., NEMA rated. Connectable to 220 and 440 volts.

P&H DC RECTIFIER WELDER

Also equipped with hand-or foot-operated Dial-lectric Control, to give the welder fingertip heat control at the work. No hard-working cranks to turn. No moving parts to wear out. Saves on power costs under load — and during idle and no-load periods. Protects the primary input line against unbalanced conditions. Three sizes, 200, 300, and 500 amps., NEMA rated.

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HARNISCHFEGER CORPORATION
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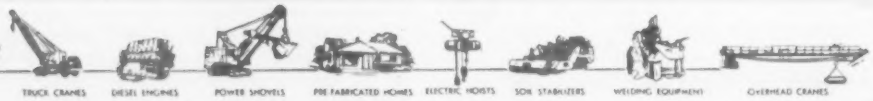
the P&H *Line*



2404

Mayor and Governor Greet IAA Delegates

BOTH the honorable Herman Talmadge, Governor of Georgia and the honorable William Hartsfield, mayor of Atlanta, were scheduled to address the opening luncheon meeting of the International Acetylene Association April 13. At the same lunch, the Morehead Medal was presented to Arthur J. Fausek, Modern Engineering Co., St. Louis, by James W. Dunham, vice-president of National Cylinder Gas Co., Chicago, and also a director and past president of IAA.

Technical sessions were set for Monday afternoon and all day Tuesday at the Atlanta-Biltmore Hotel. The business meeting for members only was held Wednesday morning. Last activity of the convention was a trip to the Consolidated Quarries, Lithonia, Ga., to see a flame-piercing operation for drilling blast holes in granite.

* * *

New Chicago Quarters for Raybestos-Manhattan

RAYBESTOS-Manhattan, Inc. has moved from 445 Lake Shore Drive into its newly constructed Chicago office and warehouse building at 6010 Northwest Highway. This new building provides greatly expanded facilities for warehousing mechanical rubber, packings and asbestos textiles and for Chicago sales offices of these products. It is also national sales headquarters for the equipment sales division.

* * *

Eutectic Gives Diamond Pins To Regional Managers

PRESENTATIONS of diamond pins were recently made to Eutectic regional managers and district engineers at a series of sales clinics. Given by president Rene D. Wasserman, the pins were in recognition of meritorious service and achievement for Eutectic Welding Alloys Corp. F. F. Roehll, national sales manager, assisted Mr. Wasserman.

* * *

San Francisco Office for Westinghouse

ESTABLISHMENT of a San Francisco branch office of the Westinghouse Electric Corp. has been announced by Walter J. Maytham, manager of the firm's Pacific coast district. Harold G. Rethmeyer is branch manager. For his branch office staff Mr. Rethmeyer has named four sales supervisors: M. Wayne Scolari, George Skipton, G. Burnett Mason and David F. Roach. Allan S. Judson

West Coasters Dominate Los Angeles Metal Show

EIGHT technical associations joined forces to present 95 technical papers in the sessions held in conjunction with the Western Metal Congress at Los Angeles' Hotel Statler March 23-27. The principal particpating societies were the American Welding Society, American Society for Metals and the Society for Non-Destructive Testing. The AWS papers dealt extensively with western activities. All but five of the 19 AWS technical speakers hailed from the West.

Welding highlight of the week was the Monday evening session, a joint meeting of the Los Angeles AWS Section and the aircraft and rocketry panel. Fred Plummer, National AWS president, was the featured speaker at this meeting. He discussed "Welding and Its Industrial Aspects" dealing with the importance of welding industry with particular reference to the use of welding in Hawaiian Islands. J. G. Magrath, AWS secretary, and Ted B. Jefferson, vice-president AWS District No. 5, Editor of THE WELDING ENGINEER, also spoke briefly.

Sessions for the American Society for Metals meetings were devoted almost exclusively to the problems arising in the smelting, refining, fabrication and finishing the rare metals, titanium and zirconium.

The Society for Non-Destructive Testing presented a diversified program devoting a session to each of the major non-destructive methods.

The sessions of the other technical societies participating were confined to one or two meetings discussing a variety of subjects.

While the technical sessions were being carried on in down-town hotels, some 50,000 people were tramping the Pan-American Auditorium viewing displays of some 375 exhibitors. From an exhibit standpoint the show was a huge success. For not only was the Exhibit Hall filled but two tents were erected in a parking lot to take care of the overflow. So many heavy machine tools were on exhibit that the exhibition could easily have been mistaken for a tool or machine show. As usual the attention-attracting exhibits were those of about 20 welding equipment and supply manufacturers.

* * *

No 3-in. Plate??

RECENTLY a national manufacturer reported to NPA that he had tried to buy 3-in. steel plate everywhere and the best quote he could get was three to five months delivery. He also reported he could not find any in the

P&H

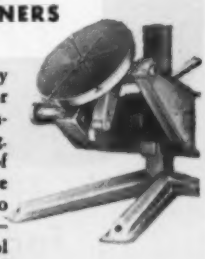
Welding Equipment

speeds production schedules, cuts costs

P&H LOW-HYDROGEN ELECTRODES

13 types for high-strength welds on problem steels, steel castings, nickel-alloy steels, chrome-moly steels, .40 carbon castings, high-hardenable steels, aircraft and similar steels.

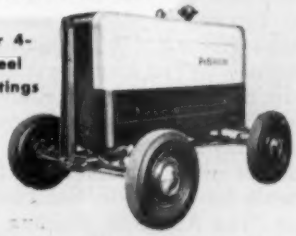
P&H POSITIONERS



Position heavy weldments for economical down-hand welding. Complete range of sizes to handle work from 2500 to 36,000 lbs. — remote-control and hand-operated models.

P&H WN-301 Engine-Driven DC ARC WELDER

2- or 4-Wheel Mountings



Portable. Equipped with Dial-electric Control, for fingertip heat control at the work — gives you faster, better welding. Runs at only 1750 rpm. Welding service range, 60-375 amps, NEMA rated.

Ask your P&H representative or distributor for complete information, or write for free bulletins.

P&H WELDING DIVISION

HARNISCHFEGER CORPORATION

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When you want
high impact strength
for your heavy duty jobs

When these shovel jaws swing open, tons of rock and earth pound every welded joint of this truck body. Only weld metal of the highest impact strength can absorb the punishment.

You can depend on Arcos Low Hydrogen Electrodes for *all* of your high tensile welding applications—not just jobs like this that require maximum ductility and impact strength. The rigid Arcos quality controls assure you weld metal of consistently superior physicals. The wide selection of Arcos grades enables you to pick the right electrode for every job. Send today for your free copy of "The ABC's of Welding High Tensile Steels". Arcos Corporation, 1500 South 50th Street, Philadelphia 43, Pennsylvania

ARCOS GRADE	A. W. S. SPEC.
Tensilend 70	E7016
Tensilend 100	E10016
Tensilend 120	E12015
Manganend 1M	E9015
Manganend 2M	E10015
Nickend 2	E8015
Chromend 1M	E8015
Chromend 2M	E9015

WELD WITH ARCOS
LOW HYDROGEN ELECTRODES

Metallizing Salvages Road-Building Axles

A LEADING manufacturer of heavy road building equipment uses metallizing for the salvage of parts accidentally mis-machined in the production shop. Repairs go to salvage the bearing and seal-fit portions of front-stub axles. These axles vary in size and shape and are valued at between $75 and $130 each.

A typical operation consists in setting up the 30-in. long and 5-in. diameter axle in a lathe and cleaning the undersize area with emery cloth. It is then sprayed with a build-up wire for about 10 minutes to bring it to the required dimensions.

A number of these axles have been in service for 18 months withstanding the toughest kind of service. No trouble has been reported with the hard, oil-bearing, metallized surface, reports the Metallizing Engineering Co., Inc., Long Island City, N. Y.

* * *

Navy Uses 430 Stainless for Some Tasks

THE Navy is using Type 430 stainless steel on many secondary applications and appliances. Any welding required for fabrication still must be done according to the product's end use.

Careful experiments have proved that bending and forming will cause cracks in the area adjacent to the weld. The only way to eliminate this in most instances is by careful heat treating.

Heat treating times should range from one hour on 1/16-in. material up to two hours on 1 in. plate. The use of 18-8 welding electrodes helps on some applications. An area near the weld may still be hard. In some instances this heat effect has also caused loss of corrosion resistance even when inert gas welding is used.

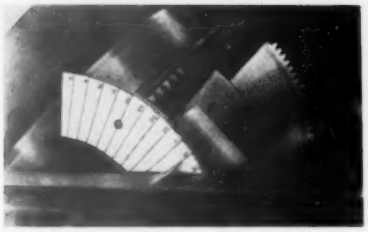
* * *

Brass-Making Film Has Color, Sound, Music

NEWEST 16 mm sound and color film made by Titan Metal Mfg. Co., Bellefonte, Pa., has an original musical score composed by Robert Stringer, well-known motion-picture composer. Produced by Unifilms, Inc., it is titled "Brass Means Business" and shows the complex machinery and high level of skills required to produce precision shapes in brass and bronze. Running time of the film is 27 minutes. Inquiries concerning use of the film should be addressed to the film department of Titan Metal Mfg. Co., Bellefonte, Pa.

NEW PRODUCTS

(Continued from page 76)



Welding Protractor

267 A NEW low-cost extra for welding positioners is a protractor for indicating tilt angles on the table. It is attached to the tilt trunion on the control side of the positioner where it is readily seen. Range of the protractor is from zero to 135 deg in 5-deg steps.

Welding research has shown that tilting the weld joint downhill about 10 deg can result in as much as 50% increase in welding speed. The Model PRO protractor can be used to obtain this tilt when it is needed and is also useful for other set-ups and techniques.

ARONSON MACHINE CO., Arcade, N. Y.

* * *

Small Wet Blaster

268 THE new Model 30 Liquamatte wet blasting machine is intended for precision cleaning and finishing applications involving small pieces that can be lifted and handled manually. Examples are maintenance and manufacture of stamping dies, die-casting dies, surfacing tools, and oil burners, cleaning oxides from tungsten carbide tips, blending different finishes on aluminum, etc.

The machine is 2½-ft long, 2½-ft wide by 6 ft 11 in. high. The blasting compartment is 30 in. square and 2 ft 7 in. high. It operates by propelling fine mesh abrasives, suspended in water, at the work.

AMERICAN WHEELABRATOR & EQUIPMENT CORP., Mishawaka, Ind.

* * *

New Pilot Valves

269 LATEST in the Hannifin "P-M" line of pilot valves is an assortment of 10 valves which can be used either 2-way or 3-way, normally closed to pressure normally open to pressure. Designated as Series C, and normally furnished only in ¼-in. I.P.S., the new valves can be used for the direct control of small air cylinders or the remote control of larger units.

HANNIFIN CORP., 1101 S. Kilbourn, Chicago 24.

How to get
top weld strength
at elevated temperatures

You'll certainly agree there's no room for error in fabricating the engines of today's high flying jets. Every welded part must be of top strength and offer maximum resistance to extreme heat.

Arcos Stainless Electrodes, which provide this peak performance in fabrication of jet engines, can give you the same high performance on *all* your welding applications. Use ARCOS STAINLESS ELECTRODES! They are your assurance that physically, chemically, and metallurgically you can get sound, dependable weld metal on every job. That saves worry and troubles later. And Arcos Quality Controls—most rigid in the industry—guarantee a better investment of your welding time and dollars. Write today for your free copy of "Electrode Selection for Welding Stainless and Alloy Steels". Arcos Corporation, 1500 South 50th Street, Philadelphia 43, Pennsylvania

WELD WITH ARCOS STAINLESS ELECTRODES

DON'T GAMBLE
on the strength of a wheel

...make snagging safe with
ATLANTIC *SPEED-TESTED*
WHEELS

If you've ever seen a wheel disintegrate under high-speed operating conditions, you'll appreciate the extra strength and maximum safety features of Atlantic Grinding Wheels.

Every Atlantic Wheel made — from the 2 inch size on up — is test run at a 50% higher speed than that required for normal snagging operations. Every wheel features a special Resinoid Bond that provides an extra measure of safety. Their smooth floating action requires less pressure and makes work easy. They cut cleaner, faster . . . run cooler. What's more, because Atlantic wheels seldom have to be dressed, they lower operating costs by eliminating the need for frequent replacements.

Check these and other Atlantic advantages for yourself. Send for the new Atlantic Grinding Wheel Catalog today. Atlantic Abrasive Corp., 540 Pearl St., South Braintree, Mass.

ATLANTIC ABRASIVE CORP.
South Braintree 85, Massachusetts

BOTH WORTH LOOKING INTO-

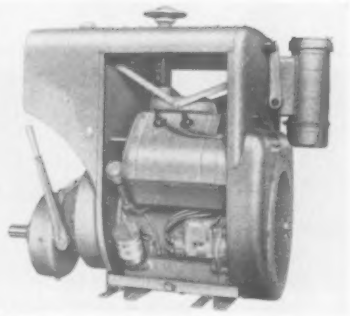
MANGANAL
11% - 13½%
Manganese-Nickel Steel
THE TOUGHEST METAL KNOWN—
For Speedy and Low-Cost Replacement of Worn Equipment Parts.

YOUR MANGANAL DISTRIBUTOR
An organization of skilled craftsmen that you can depend on for sound advice, to save time and money on the repair and rebuilding of heavy equipment.

MANGANAL
U.S. Patents 1,876,738—1,947,167—2,021,945
11%-13½% Manganese-Nickel Steel
- APPLICATOR BARS • WEDGE BARS
- SPECIAL SHAPE APPLICATOR BARS
- HOT ROLLED PLATES • SPECIAL TITE-KOTE AND BARE WELDING ELECTRODES
- SEACO HARD SURFACING WELDING ELECTRODES

STULZ-SICKLES CO.
SOLE PRODUCERS 92 N. J. RAILROAD AVE. NEWARK, N. J.

FREE WALL CHART
New edition illustrating 23 actual size WEDGE BARS with dimensions and weights, for easy reference.
WRITE TODAY!
Send for FREE helpful tips on speedy and economical repair of worn equipment.
NEAREST DISTRIBUTOR UPON REQUEST



Air-Cooled Engine

270 MOST recent addition to the Wisconsin engine line is the new 4-cylinder, V-type Model VG4D. It has a 3½-in. bore, 4-in. stroke and 154 cu. in. displacement, developing a peak rating of 36 hp at 2,200 rpm. It is said to be an exceptionally smooth-running, even-firing engine, designed to provide an extra margin of power needed for operating equipment within a 25 to 36 hp range. All of the traditional features found on Wisconsin engines and proved through the years are a part of the new VG4D engine. When specified, these engines may be equipped to operate on kerosene, fuel oil or natural gas.

WISCONSIN MOTOR CORP., 1910 S. 53rd St., Milwaukee 14, Wis.

* * *

Heat Treating Furnace

271 TEMPERATURES up to 3,100 F. can be obtained in a new metallurgical heat treating furnace made by Westinghouse. A water jacketed chamber, an integral part of the furnace, permits work to be cooled as well as heated in a protective atmosphere. The furnace was designed for either hydrogen or dissociated ammonia atmospheres. Four manually operated, counterbalanced doors on the furnace separate its charging, heating and cooling chambers. Intended for batch type heating, the work is handled on trays and manipulated by push and pull rods. Heating elements are formed from heavy molybdenum alloy rod.

WESTINGHOUSE ELECTRIC CORP., Box 2099, Pittsburgh 30.

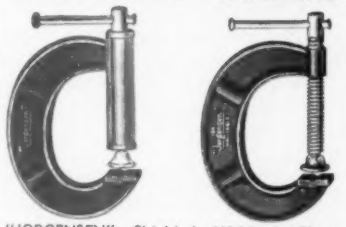
* * *

Anti-Fog Cloth

272 A specially-impregnated cloth called "No-Mist" is said to prevent the formation of fog or steam on weldor's goggles or facemasks, as well as windows, mirrors, etc. after it has been wiped over the surface. The cloth cleans and fog-proofs in one operation.

CAROL CHEMICAL PRODUCTS CORP., 368 East 45th St., Brooklyn 3, N. Y.

"Jorgensen" and "Pony"
CLAMPS for WELDERS:

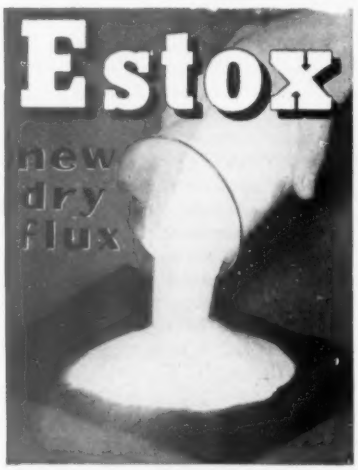


"JORGENSEN" Shielded Welders' Clamps eliminate damage from "spatter", and are low-priced. "Regular" "C" clamps are available too, if preferred.

"PONY" Clamp Fixtures make ideal bar clamps on any length of black pipe. Fast operating—sure holding—and most economical.

"JORGENSEN" Steel Bar Clamps are designed for the severe requirements of welding service; exclusive "multiple disc clutch" makes for instant adjustment—economy. The trade-mark "JORGENSEN" or "PONY" on your clamps is assurance of utmost satisfaction in service—specify and insist upon them from your supplier. FREE CATALOG ON REQUEST.

ADJUSTABLE CLAMP COMPANY
"The Clamp Folks"
426 N. Ashland Ave., Chicago 22, Ill.



FREE FLOWING. Contains new additive that cleans surfaces, insures better joints.

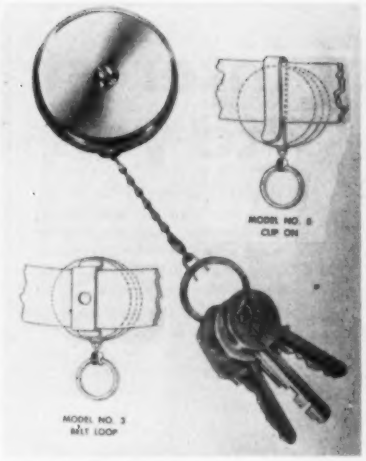
Estox 100—For Cast Iron brazing and welding.

Estox 200—For Brass, Bronze and Silver Brazing. Try it out on your toughest welding job—stainless steel.

Sold and billed through welding supply distributors. Or you may order direct, advising name of supplier.

Two shipping points: New Haven and Detroit

The Standard Supply Company
460WE Grand Ave., New Haven, Connecticut



273 **NEWEST model "Key-Bak" saves time for weldors, drill press operators and other workers who must carry lighters, keys, tip cleaners, etc. About the size of a pocket watch, the "Key-Bak" has a Swedish clock spring to automatically reel back a 24-inch long steel chain and swivel connection. Lummis Mfg. Co., Pasadena 8, Calif.**

* * *

Silicone Weld Back-up

274 THINNED-DOWN "bouncing putty" is now being used as a weld-backing compound. A silicone material, it is painted on the back side of joints before welding. It can be used with all arc welding processes except automatic tungsten inert-gas.

The new compound is said to overcome many disadvantages of fluxes, metal and gas backing media. It is easily applied to complex shapes and the powder residue left after welding can be quickly removed with a cloth. Since it promotes no carbon pickup in the weld, it is useful in the welding of low-carbon stainless steel. It gives off no noxious fumes and is non-explosive. One 16-oz can of the paste covers 1,300 lineal ft of joints when applied in a strip ½-in. wide.

GENERAL ELECTRIC CO., Fitchburg, Mass.

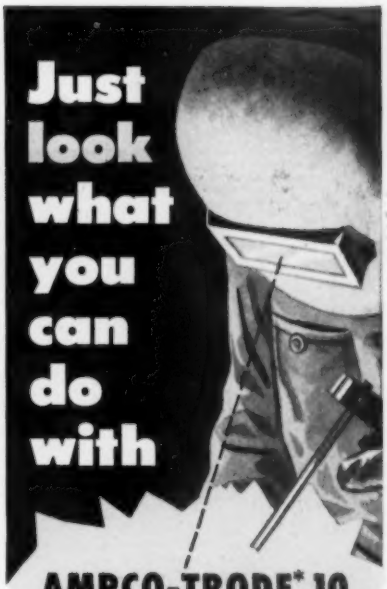
* * *

Aluminum Bronze Rod

275 TWO new types of all-purpose aluminum bronze electrodes have been added to the existing line of Weldwire products. They are Weldbest Albronze 100 and Albronze 250. The first is capable of depositing weld metal having a Brinell hardness of 100, the second a Brinell number of 250. For automatic inert-gas metal arc welding, the new material is called Weldspool Albronze 100 and 250.

WELDWIRE CO., INC., Emerald & Hagert, Philadelphia 25.

Just look what you can do with



AMPCO-TRODE* 10
Bronze Electrodes

See us at the Welding Show, Shamrock Hotel, Houston, Texas, June 16-19, Booths 126-127

Weld Cast Iron
Weld Galvanized Iron
Weld Dissimilar Metals
Make Wear-Resistant Overlays
Make Corrosion-Resistant Welds
etc.

Yes, you can do a lot with Ampco-Trode 10. That's why we call this covered aluminum bronze electrode a general purpose rod.

When making overlays or when bronze-welding ferrous metal, we recommend medium arcs and weave beads. Amperage range is wide, because it welds a wide variety of metals. Use low side of amperage range for joining iron-base metals . . . the middle of the range for bronzes . . . the high side of the range when welding bearing copper base alloys.

The versatile utility of Ampco-Trode 10 keeps costs down, so it pays to have a supply on hand. If you want additional information call your Ampco distributor or write us.

W-118

AMPCO METAL, INC.
MILWAUKEE 46, WISCONSIN
West Coast Plant: Burbank, California
IT'S PRODUCTION-WISE TO AMPCO-IZE!
*Reg. U. S. Pat. Off.

FACTS . . . of interest to you

RANITE Type "F" is a new rod that can be applied in the conventional manner or used with a newly developed procedure to obtain even better wearing results.

Write today for your copy of FORM F. It shows you exactly how to use the new RANITE "F" to get longer wearing life on hard surfaced parts.

Take advantage of this new method to prolong equipment life and to greatly reduce operation costs.

The procedure is simple to use — it can easily be followed in every shop, and the pamphlet gives exact instructions to obtain best results.

There is a RANITE distributor near you — contact him for service and assistance, or write to our Los Angeles plant for your pamphlet and any further details.

RANKIN MANUFACTURING CO.

3072 WEST PICO BLVD. LOS ANGELES 6, CALIF.

"Trindl is tops"

Says William Murray, Chicago Stadium Engineer

And that's not all—This Trindl 160A Arc Welder saved the Stadium thousands of dollars in time and labor costs. These low cost, high-quality welders are designed to handle production work with perfection eliminating costly work stoppage as Mr. Murray's letter testifies.

This is an actual photo of the Trindl 160A Welder in operation on the Chicago Stadium job. Complete details and illustrated literature on the remarkable performance of the Trindl Constellation line available. Contact your local dealer or write Dept. T10-F for information.

There is a Trindl Constellation Welder to suit every job at a cost to fit every budget. 8 Models from 30 to 400 Amperes unconditionally guaranteed for 12 months.

Trindl — "ON TESTED ARC WELDERS"

TRINDL PRODUCTS LTD., 17 East 23rd Street, Chicago 16, Ill.

Rod for Rails

276 THE new Oxweld "Driburn" welding rod was specially developed to build up "driver burns" on railroad rails. Heretofore, track crews had used the same rod to repair rail ends and such burns. Usually, the built-up burn would cold-roll into a hardness greater than the surrounding area to produce an undesirable secondary batter from train wheels.

Advantage of the "Driburn" rod is that its deposit equals the hardness of the parent rail steel and therefore wears at the same rate. No secondary batter can develop. Use of the new rod is recommended as a handy teammate for the well-known Oxweld MW rod for jobs where both driver burns and rail ends are to be serviced. "Driburns" come tipped with green in 3/16 and ¼ in. diameters. All rods are 36-in. long.

OXWELD RAILROAD SERVICE CO., 30 E. 42nd St., New York City 17.

* * *

Stainless Silver Solder

277 A NEW silver-bearing solder for joining stainless steel is applicable with a soldering iron or torch at 430 F. Still a soft solder, the new alloy is said to help greatly in certain joining applications heretofore only possible with silver brazing. Its lower cost and simple application are said to be other advantages.

Called "All-State No. 430 Silver-bearing Stainless Steel Solder," it contains neither lead, zinc or cadmium. Average physical strengths obtainable on interconnecting stainless, copper and brass are: tensile, 10,000 to 28,000 psi; shear, 10,000 to 15,000 psi and elongation in 2 in., 10 to 28%. Color match with the parent stainless is said to be close. It comes in 1/16, 3/32 and ⅛ in. wire.

ALL-STATE WELDING ALLOYS CO., White Plains, N. Y.

* * *

Norwegian Holder

278 A NEW fully-insulated electrode holder made in Norway features a sturdy grip on the electrode. This is accomplished by a pivoted lock plunger that holds it tightly against the electrode head. Torsional strain between the lock plunger and the electrode is thus avoided. This type of construction makes it possible to use a larger diameter plunger to insure an exceptionally good contact between the electrode and holder head.

LAUKVIK WELDING PRODUCTS, Platougt 4, Oslo, Norway.

8–In. Pipe Coupler

279 NEWEST "Snap-Tite" coupler fits in an 8-in. diameter pipe line. Construction includes standard flanged connections and a valve in the coupler body which automatically shuts off the liquid flow when the male part (nipple) is removed. The coupler comes also without a valve.

The quick-connect feature eliminates the necessity of having a maintenance man with tools available for connecting or disconnecting any workman can make or break a connection by merely sliding a sleeve on the coupler.

SNAP-TITE, INC., Union City, Pa.

* * *

Cabinet Oven

280 NEW cabinet ovens are equipped with a high-pressure motor-driven blower which propels heated air in a definite airflow pattern through the work chamber.

Other features include an indicating temperature control, high and low heat-switch for close control and quick recovery, Inconel-sheathed heating elements, manual interlock for purge-period operation of blower without heat and electrical interlock for turn-off of heat in case of blower motor failure. Temperatures to 650 and 850 F for 220 or 440 volt operation.

GRIEVE-HENDRY CO., INC., 1811 W. Lake St., Chicago 12.

* * *

Product Briefs . . .

281 **Portable** six-channel oscillograph permits simultaneous recording of six channels of instantaneous electric phenomena in the frequency range of d-c to 100 cycles per second. Brush Electronics Co., Equipment Div., 3405 Perkins Ave., Cleveland 14.

* * *

282 **Electric soldering** iron, Model L-72, features a metal ground plate on which jigs could be mounted. An adjustable heat control allows the electrodes to heat up instantly to 1,250 F. Sunrise Products Co., P. O. Box 173, Hawthorne, N. J.

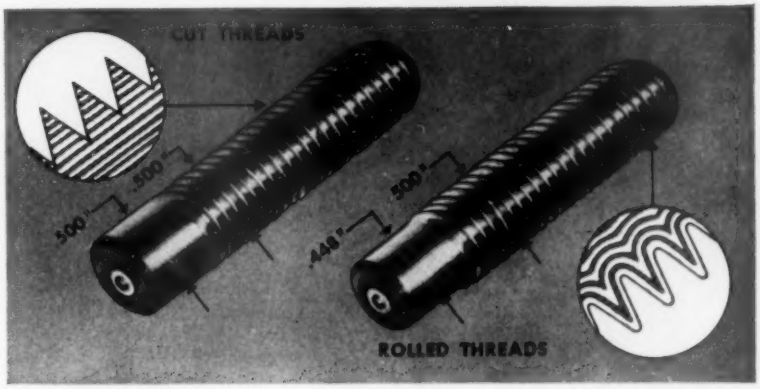
* * *

283 **Connector soldering** machine is rated at 250 watts. It can solder from 2 to 30 terminals, and more, on AN connectors, and can be used on terminal boards or printed circuits with hard solders that can't be handled with a soldering iron. Joyal Products, Inc., 56 Belmont Ave., Newark 3, N. J.

improved stud welding
through **K S M** engineering

20% GREATER STUD STRENGTH . . .
FASTER WELDS WITH

K S M ROLLED THREAD STUDS



By using K S M standard welding studs designed with rolled thread you benefit by:

20% increase in stud strength — *Greater stud ductility*
Smaller shank diameter — *Increased welding speed*
Lower cost studs

Rolled thread studs lower stud costs by introducing production techniques that enable K S M to manufacture stronger welding studs with less material. For example, a ½" standard thread is developed from .448 pitch diameter stock. Cold-working the steel during the thread rolling process produces a higher tensile strength stud with mirror-like thread finish. Not only are fatigue paths set up by thread cutting eliminated, but the thread area grain structure is refined to produce an overall strength increase of 20%.

The resulting design of K S M standards produces a welding stud which has better weldability due to the decreased shank diameter, yet does not sacrifice strength at the weld area nor in the shank itself.

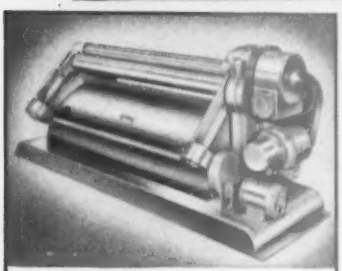
Rolled threads are one of many improvements K S M engineering is providing users of electric-arc stud welding . . . improvements that make tough fastening jobs easy and fastening costs lower.

Get K S M benefits for your stud welding. K S M Products, Inc., Merchantville, N. J. Phone Merchantville 8-4160.

REED
ENGINEERING CO.

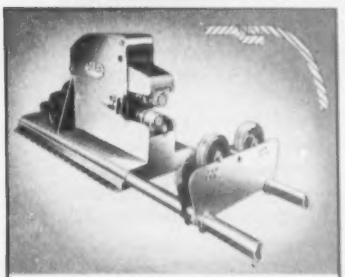
Modern
Metalworking
Equipment

- BENDING ROLLS
- TURNING ROLLS
- AUTOMATIC WELDING FIXTURES



REED PLATE BENDING ROLLS

- ★ In 18 models, ranging from 3 ft. x 10 ga. to 8 ft. x ¼" in capacity
- ★ Rugged, all steel construction
- ★ Built-in, silent worm gear drive
- ★ Durable, special bronze bearings
- ★ Power adjustment & air drop end available on most models



REED OFFSET FORMING MACHINE

- ★ Improves automatic welding production by eliminating chill-rings and backing bars
- ★ Forms offset weld-backing joggle from tank shell
- ★ Loosens rust and mill scale
- ★ Improves shell roundness
- ★ Two models: M-2—1/16 to 3/16" plate
  M-4—3/16 to 7/16" plate

WE INVITE YOU . . .
to write us for specifications, prices, list of REED users near you. No obligation. Just write on your letterhead.

REED ENGINEERING CO.
1007 W. FAIRVIEW, CARTHAGE, MISSOURI

CHESTER A. SIVER has been appointed general manager of engineering for Black, Sivalls & Bryson, Inc., Kansas City. He was formerly manager of engineering for Liquid Carbonic Corp., durable goods division, Chicago. Former jobs were with American Machine & Foundry and Linde Air Products Co. He is an Annapolis graduate and holds a M. S. in mechanical engineering from MIT and is also a graduate of the advanced management program, Harvard Business School.

* * *

GEORGE M. GRAETZ has been named manager of the new eastern plant of the A. O. Smith Welding Products Division, now being built at Lancaster, Pa. For the past year he has served as assistant to group executive J. J. Bohmrich of A. O. Smith and had been project manager in the development of the new plant for making welding electrodes. He has previously been works manager at Trackson Co. and Line Material Co., Milwaukee.

* * *

WILLIAM F. MONAHAN has been named central New York representative for Detroit Stamping Co., with headquarters at Rochester, N. Y. He was previously with Eastman Kodak Co.

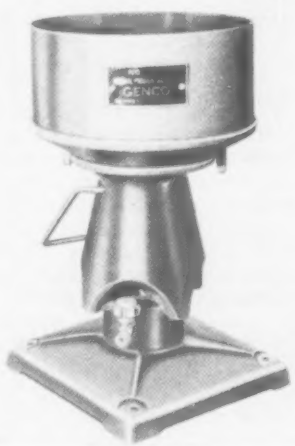
* * *

GEORGE J. PERRY has been appointed to the new post of promotion manager of Whitehead Metal Products Co., Inc., with responsibility for advertising, market and sales analysis. He has been with Whitehead for 20 years.

* * *

D. E. DALLMAN has been named manager of the Minneapolis district of Air Reduction Sales Co., to replace the late M. M. WEIST who passed away March 6. Mr. Dallman has been with the company 18 years and was formerly eastern railroad sales manager and recently assistant district manager.

Now
YOU CAN USE
ONE FURNACE
for
Acetylene or Propane



GENCO Model No. PF #2

CAN BE CONVERTED IN SECONDS!

Yes, convert from overtank type to floor furnace in a matter of seconds with this GENCO.

WINDPROOF
ECONOMICAL
SAFE — CLEAN
FOR EVERY
MELTING JOB

Used by plumbers, pipe fitters, electricians, roofers, tinsmiths, mechanics. Compact. Lightweight. Easily assembled. Burns 15 hours on 5 gallons of L.P. Gas.

General Propane Gas Corp.
189 Third Street, Mineola, N. Y.

WILLIAM H. ROBERTS has been elected vice-president and secretary of Detroit Stamping Co., Detroit, succeeding John Beck and H. G. Roberts. Mr. Roberts assumes his new post after 15 years of service with De-Sta-Co. He was made manager of the finished products division in 1945 and is a member of the board of directors of the company.

* * *

WILLIAM M. TINNON has been named sales manager of the Drawalloy Corp., York, Pa., manufacturer of stainless, tool steel and special alloy welding wire. He graduated from Rensselaer Polytech in 1942 with the degree of BMet E and served for four years in the Navy, being discharged a lieutenant. After World War II he was associated with Bridgeport Brass Co. and with Crucible Steel Co. He has been with Drawalloy since September, 1952.

* * *

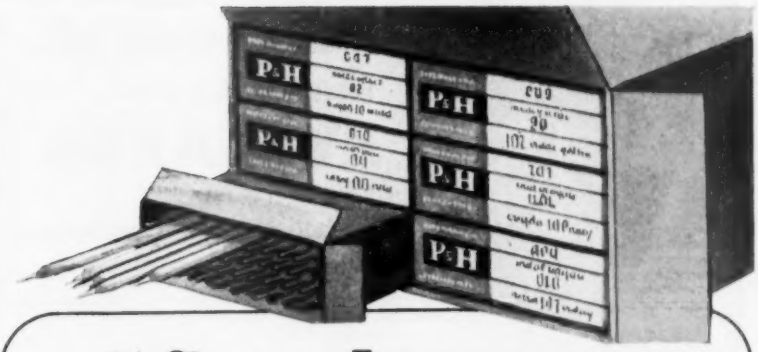
JAMES E. CASTLE recently joined Foote Mineral Co. as manager of the lithium mining and milling division at Kings Mountain, N. C. He has had extensive experience in mining engineering work. ERNEST A. REMESCH has also joined Foote as superintendent of the new lithium processing plant at Sunbright, Va. He worked for DuPont for 16 years and was recently assistant plant manager of the Melson Fertilizer Co., Georgetown, Dela.

* * *

JAMES O. CLEVENGER has been appointed sales manager of general industrial products of the Westinghouse Electric Corp. He was formerly manager of the welding department at Buffalo. He joined Westinghouse in 1927. In 1947 he was made manager of agency and specialty sales for the company's southeastern district in Atlanta, Ga. His new headquarters will be at Pittsburgh.

* * *

A. A. PROBECK has been elected vice-president of Snap-Tite, Inc., Union City, Pa., manufacturers of quick-connect couplers for industrial, domestic and farm uses.



Cuts down your inventory

of seldom-used electrodes

P&H

Maintenance Pack

Small-package assortment of electrodes for repair and maintenance welding

You don't have to buy seldom-used electrodes in quantities larger than you need. With the P&H Maintenance Pack, you can keep some of each type on hand—economically. This assortment includes seven different electrodes packaged to stay dry — and clearly labeled to make selection easy. You're equipped to do all kinds of repair and maintenance jobs—get fast, easy, sound welds.

Let the P&H Maintenance Pack save you time, trouble, money. Order from your P&H representative or local distributor.

7 different electrodes

(Approximately 27 lbs.)

- **AC-3, 1/8", 5/32", 3/16"** — For all position welding of mild steels and sheet metal. AC or DC.
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GLENN E. SMITH has been named west coast representative for Tweco Products Co., Wichita, Kansas. He will live in San Jose, Calif., and will cover seven states on the coast and in the mountains. Mr. Smith has been with Tweco for three years in various departments. He will work with Tweco distributors in his seven-state area.

* * *

ROBERT H. NEWTON Co. will represent the Multi-Hydromatic Welding and Manufacturing Co. in the Cleveland area, Ohio and nine counties in western Pennsylvania. Mr. Newton is a graduate of the University of Michigan and was with Lincoln Electric Co. for 22 years.

* * *

FRANCIS G. JONES has been named midwest sales representative for National Torch Tip Co. He was formerly welding equipment sales manager for Liquid Carbonic Corp., Chicago. He has had extensive sales engineering experience in the gas welding and cutting fields. The states of Illinois, Indiana, Iowa, Kansas and Missouri will be his territory.

* * *

KENNETH J. HUMBERSTONE and GEORGE F. FRANCK have been named vice-presidents at The American Tank & Fabricating Co., Cleveland. Mr. Humberstone is in charge of engineering, manufacturing and sales. Mr. Franck is manager of the firm's Elmwood Avenue plant and vice-president in charge of steel warehouse sales, flame-cutting and metallizing operations.

* * *

A. S. PAYNE has been named director of industrial relations for Air Reduction Co., Inc. Mr. Payne has been with the company for 32 years and was formerly vice-president of the Ohio Chemical and Surgical Equipment Co. division in Madison, Wis. He will headquarter at New York. Before going to Madison in 1949, he was assistant controller of the corporation.

* * *

CLYDE H. HAYNES has been appointed manager of the patent department of the Nelson Stud Welding Division of Gregory Industries, Inc. He is a member of the National and Ohio Society of Professional Engineers, the AIEE and is a registered patent attorney in this country and Canada.

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JOHN WAGNER has been appointed regional manager for All-State Welding Alloys Co., Inc., to cover New Jersey, Delaware and parts of Maryland and Pennsylvania. Previous to joining All-State, Mr. Wagner was a representative for Eastern Equipment Co., and had done considerable work with welding processes in construction work.

* * *

OWEN BARTON, head of Barton Sales Co., Fort Wayne, Ind., has been appointed sales representative for Hanna Engineering Works, Chicago, makers of hydraulic and pneumatic cylinders, valves and riveters. He will service northern Indiana, previously handled from the Chicago office.

* * *

Died . . .

GEORGE N. SIEGER, 63, died April 1 while visiting in Indianapolis. He was president of S-M-S Corp., Detroit, manufacturers of resistance welding electrodes, which he founded in 1933.

Mr. Sieger was a past national president of the American Welding Society in 1948-49 and of the Resistance Welders Manufacturers Association in 1947-48. A native of Pennsylvania, he became interested in welding shortly after graduation from Lehigh University when he went to work for the Electrolytic-Oxy-Hydrogen Dept. of the Davis-Bournonville Co. He served in World War I as a captain. After the war he went with P. R. Mallory in an executive post until he organized his own firm. He was an early advocate of a separate exposition for the welding industry, the first of which will be held next month in Houston. He is survived by his wife Mildred, a brother, son and daughter and granddaughter.

* * *

CLIFTON WYATT, of Southwestern Welding Supply Co., San Angelo, Texas, died March 16.

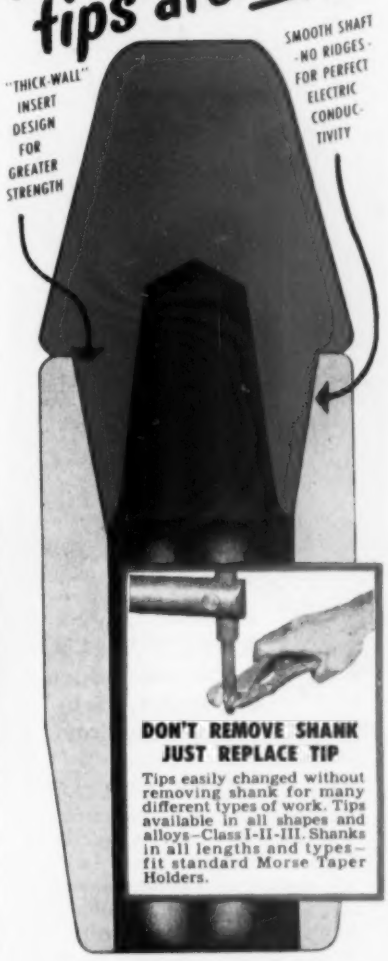
* * *

M. M. WEIST, Minneapolis district manager of the Air Reduction Sales Co., died on March 6. He was with Airco for 35 years.

* * *

WILFRED E. PETERSON, president of Interstate Welding Supply Co., Cambridge, Mass., died Dec. 20. He had worked with welding people in New England for many years and was a former employee of General Electric Co. and The Lincoln Electric Co.

Pacific REPLACEABLE tips are tops!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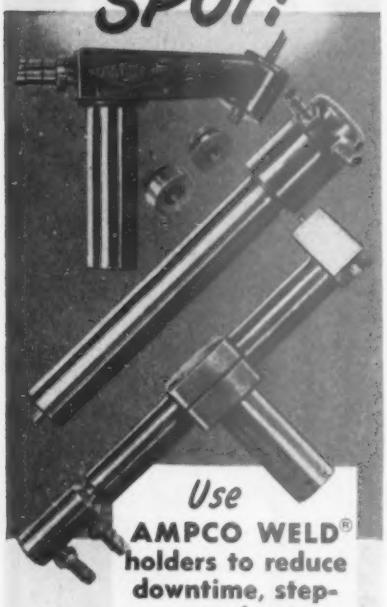

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Carbon Steel Piping

RULES FOR WELDING PIPING IN MARINE CONSTRUCTION-CARBON STEELS. Published by the American Welding Society, New York, 1953. Paper, 6 by 9 in., 12 pages. Price 50c.

The new edition of the rules for welding carbon steel piping for shipboard use is a revision of the 1948 AWS standard. It includes changes and clarifications of the requirements agreed upon by the "enforcement authorities" in the shipbuilding industry: the American Bureau of Shipping, the Navy Department and the Coast Guard.

Of special interest are typical joint design details for splices, branches and nipples. An X-ray standard for evaluation of weld quality has been added. Specific electrode requirements as to classification and sizes for different welding positions are written in as are expanded descriptions of weld quality and weld defects. As revised, the carbon steel piping rules parallel in content and arrangement the corresponding rules for ferritic alloy steels issued by the AWS in 1952.

* * *

Air Tool Study

COMPRESSED AIR POWER IN INDUSTRIAL PRODUCTION. Published by the Compressed Air and Gas Institute, Terminal Tower, Cleveland. Paper, 8½ by 11; 36 pages. Price 25¢.

This pamphlet is directed to designers, engineers, and production men in industrial plants who deal with pneumatic tools. It is the third in a series of engineering studies in the institute's educational program.

Concise but comprehensive discussions are presented on such subjects as actuation by air cylinders, agitation of liquids, blast cleaning, chipping and scaling, clamping, drilling, forging, grinding, hoisting, instrument control, molding and die casting, ramming, riveting, screw driving, nut running, spraying and others.

More than 63 illustrations are presented including 13 tables. Tables contain such valuable data as the number of caulking, chipping and scaling hammers that can be operated by various size compressors.

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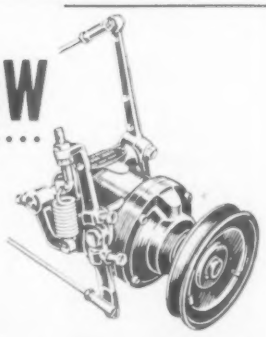

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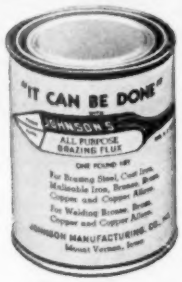

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Brazing Processes

INDUSTRIAL BRAZING, by H. R. Brooker and E. V. Beatson. Published by Iliffe & Sons Ltd. (British Book Centre, New York City) 1953. Cloth, 5½ by 8½ in.; 344 pages. Price $7.50.

This is the first full-length, authoritative study of brazing as a metal fabricating process. It covers in considerable detail all modern brazing methods: torch, furnace, high-frequency induction, resistance, salt bath and dip processes. Special considerations necessary for work on aluminum, stainless steels, beryllium copper, cemented carbides and vacuum tube construction are dealt with separately.

A general introduction to the processes and the equipment employed is followed by a review of brazing materials and a very complete summation of the known factors governing joint design. Finally, a chapter discusses problems in selecting the appropriate brazing processes for various jobs. It also makes a useful contribution on inspection methods and testing.

The book is illustrated with over 200 photos and diagrams depicting various phases of the different processes. A vast amount of reference material is provided both in the text and in some 32 tables.

* * *

Brazing Filler Metal

SPECIFICATIONS FOR BRAZING METAL. Published by the American Welding Society, New York, 1953. Paper, 6 by 9 in.; 9 pages. Price 40c.

These new specifications discuss a field which has not heretofore been generally covered except for a few materials. Here are given specifications for every type of brazing filler metal in common use today. The 33 different classifications are divided into groups according to the principal constituents. They include classifications for aluminum-silicon, copper-phosphorus, silver, copper-gold, copper and copper-zinc, magnesium and heat-resisting filler metals.

An appendix gives helpful information on the selection of the filler metal best suited for a particular application. Among subjects discussed are the brazing temperature range for each classification, the color of the joint obtained, recommended joint designs and an explanation of some of the fundamental concepts of brazing which have previously been misunderstood.

* * *

To obtain additional information on any advertised products, use the cards on pages 33-34.

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If your shell, rocket or Burster job specifies brazing with Silver Alloy Rings, it will pay you to contact the *one* manufacturer who *completes the job* — and at minimum costs.

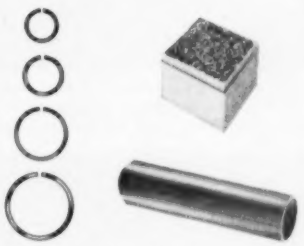

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EXHIBIT 54, HOUSTON SHOW

30 YEARS AGO

(Taken From THE WELDING ENGINEER of May, 1923)

PROF. Hans Goldschmidt, inventor of the widely known Thermit process for welding iron and steel died in Baden-Baden, Germany, May 20, 1923. Prof. Goldschmidt entered the firm of Th. Goldschmidt at Essen in 1887. He devoted himself to scientific research which ultimately produced the Thermit process. A frequent visitor to America, he was president of the Goldschmidt Thermit Co., now Metal & Thermit Corp., from 1904 to 1916.

—30 YEARS AGO—

CLEVEREST ad line in THE WELDING ENGINEER this month is in the Modern Engineering Co. copy. Beneath a drawing of a ruler is the Japanese proverb: "Measure a thousand times but cut once—then use a (Modern Engineering) cutting torch and your first cut will be successful."

—30 YEARS AGO—

MALLEABLE iron filings and chips were mixed in a brazing flux recently to produce good Tobin bronze welds in a cast iron radiator base. The Samson tractor had to be on the job right away, so the farmer didn't allow the weldor to follow the usual preheating and welding procedure. His repair worked all right, because a half hour after finishing, the farmer drove it 28 miles to his farm.

—30 YEARS AGO—

REPAIRING damaged forging dies by arc welding is the topic of an article this month by A. M. Candy, general engineering dept., Westinghouse Electric & Mfg. Co. Special electrodes with 1% carbon and 0.6% manganese are used. Mr. Candy also describes the arc welding repair of a shear blade 120-in. long, 8-in. wide and 1½-in. thick.

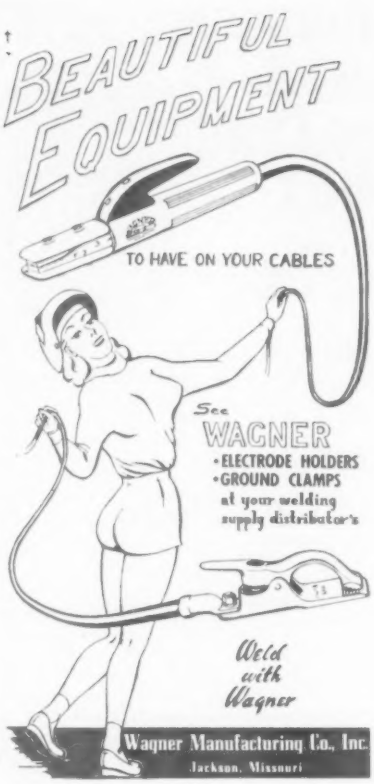
—30 YEARS AGO—

GAS welding of steel earth-moving tractor wheels is described in THE WELDING ENGINEER this month. Carbon paste is used to make a special mold around the cast iron hub. Weld deposits come out so good they look as if they've been finish ground.

—30 YEARS AGO—

NEW cylinder-carrying cart for crane transfer of cylinders is pictured in this issue. Formerly two lengths of chain were slung around the cylinders, which would occasionally fall on workmen.

—30 YEARS AGO—



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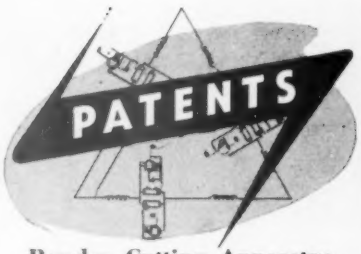
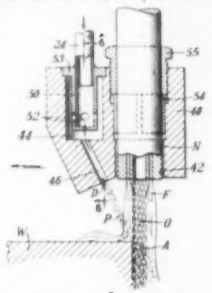


Powder Cutting Apparatus

2,627,826. EDWARD MEINSCKE, Summit, N. J. Assigned by mesne assignments to Union Carbide and Carbon Corp., New York City. Filed May 21, 1949. Granted Feb. 10, 1953.



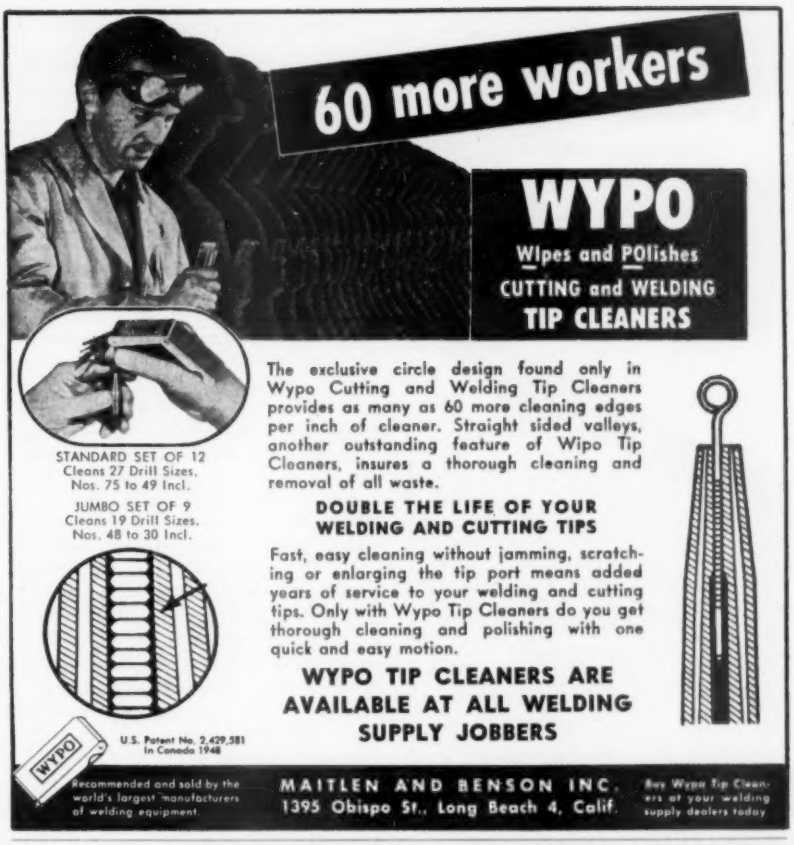
This patent refers to a newly-patented apparatus for thermo-chemically removing material. It consists of a nozzle with a first passage for directing an oxygen stream against the workpiece and a second passage inclined downward toward the first passage for directing a stream of combustion-aiding powder into the oxygen stream below the nozzle. A third passage between the first and second directs a preheating flame so as to intersect the stream of powder and heat particles of it to their ignition temperature enroute to the oxygen stream. A source of powder is connected to the second passage.

* * *

Pipe Welding Joint and Backing

2,623,148. BELA RONAY, Glen Burnie, Md. Filed July 24, 1951. Granted Dec. 23, 1952.

This process was developed to join the ends of tubular members with an inside bead. First, the ends to be joined are angularly bored to a depth about half the thickness of a welding bead. The outside of the joining ends are next beveled. The inner surfaces of the tubes at the joint ends are then coated with a mouldable refractory backing that solidifies after application. The backing is cut after it solidifies to a uniform planar surface projecting beyond the tubular end. The backing is relieved in the region of the end boring. When the tube ends are butted together, weld metal is deposited to fill the spaces formed.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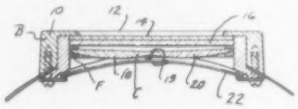
Opthalmic Weldor's Lens

2,628,530. ELLIS L. RABBEN, Norfolk, Va. Filed Aug. 3, 1949. Granted Feb. 17, 1953.

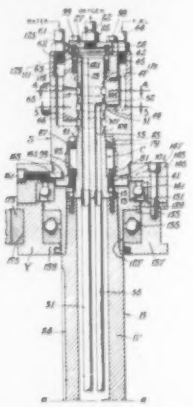


This patent refers to a visual aid for a weldor's helmet. It is located in the aperture behind the cover and filter glasses. The aid comprises a flat, rectangular frame channeled on its inner edges. A pair of rectangular ophthalmic corrective lenses are fitted within the channeled frame. The innermost edges of the lenses abut one another in a vertical central line. The lenses are angled to each other and to the frame with the abutting edges closer to the eyes than the distal edges. This is such that the lenses are about perpendicular to the lines of sight drawn on the object. The angling and power of the corrective lenses are selected to give clear vision at the desired object distance in conjunction with the spectacle power which the user requires for normal vision.

* * *

Torch for Rock-Piercing

2,628,817. RAY ORION WYLAND, JR., Somerville, N. J. Assigned to Union Carbide and Carbon Corp. Filed Jan. 24, 1950. Granted Feb. 17, 1953.



This recently patented rock-piercing torch has a rotating member and a non-rotating member provided with inlet means for supplying oxygen, fuel and water. The oxygen, fuel and water are transferred from the non-rotating member to the rotating member across an interface between the members. The method of preventing premature admixture of the oxygen and the fuel at the interface comprises transferring water across the interface between the oxygen and the fuel regions of transference.

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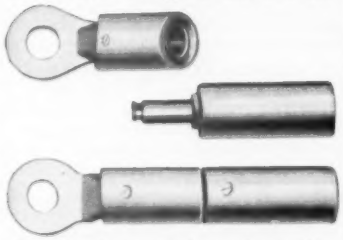

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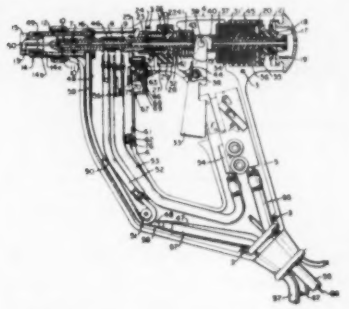
Boston at Mosley WICHITA, KANSAS

TWECO PRODUCTS

Arc Spot Welding

2,628,302. JOSEPH M. TYTNER, Brookside, N. J. Assigned to Air Reduction Co., Inc., New York City. Filed March 22, 1951. Granted Feb. 10, 1953.



Newly patented apparatus for arc spot welding includes an electrode holder, a non-consumable electrode and a support in which the holder is slidably mounted. Means are provided for advancing the holder in the support to bring the end of the electrode in contact with the work when the end of the support is against the work. Other means retract the holder and stop means limit the rearward movement of the holder in the support. Manually movable auxiliary means are operable independently of the advancing and retracting means for moving the holder forward in the support. The manually- movable means have a limited amount of movement in one direction which serves to move the holder forwardly a distance equal to the desired length of the arc gap. Thereby the electrode holder is moved the said distance by the auxiliary means while the end of the support is held against a flat surface. The electrode is then adjusted in the holder to contact with the surface so it will produce an arc gap of the desired length when the holder is moved to its fully retracted position.

* * *

Powder Scarfing Process

2,622,048. FRED MOESINGER, JR., Morristown, N. J. Assigned by mesne assignments to Union Carbide and Carbon Corp. Filed April 18, 1950. Granted Dec. 16, 1952.

This newly patented process desurfaces a refractory metal body. It includes applying preheat to a local surface part of the body, discharging a relatively flat stream of oxidizing gas at an acute angle against such heat part and discharging a separate continuous relatively flat stream of gas containing uniformly transversely distributed powdered solid fuel at an acute angle toward the oxidizing gas stream.

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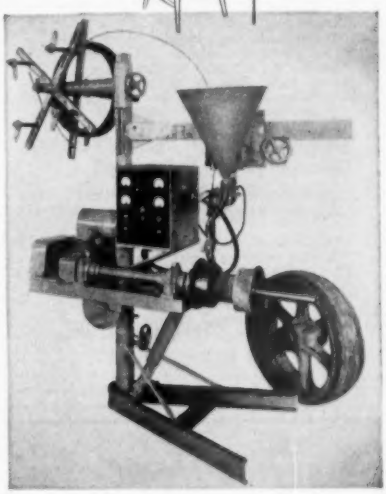

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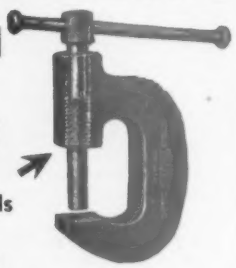

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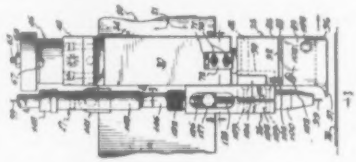
CHICAGO 14, ILLINOIS

Tungsten Inert-Gas Head

2,628,301. ROBERT E. DAHL, Hinsdale, Ill. Assigned one-half to Advance Transformer Co., Chicago. Filed March 8, 1951. Granted Feb. 10, 1953.

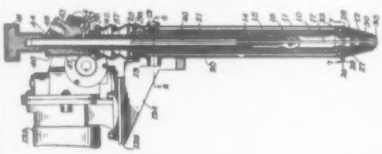


A recently patented head for automatic tungsten inert-gas welding is made to be secured to a moving carriage. One part of the head is fixed relative to the carriage. Another part is adapted to be reciprocable to the fixed part. A slide member is fixed to the reciprocable part. It is cooperatively engaged in a slide way provided in the fixed part. A nozzle-holding member has means guiding an electrode through the nozzle and means for leading electric current and gas to the workpiece. The reciprocable member has a work-engaging shoe and means for biasing the reciprocable member to move in a direction pressing the shoe against the workpiece. Other means associated with the fixed part overcome the bias to raise the shoe from the workpiece when desired.

* * *

Tungsten Inert-Gas Holder

2,628,325. WALTER S. SCHAEFER, East Gadsden, Ala. Assigned to Republic Steel Corp., Cleveland. Filed Feb. 4, 1949. Granted Feb. 10, 1953.



This patent refers to a holder for tungsten inert-gas welding and comprises an elongated hollow body with a nozzle arranged so as to define a continuous passageway for receiving an electrode. There is a holder mechanism within the passageway. Means are provided for moving the body lengthwise toward and away from a work piece to be welded. Second means include an electric motor for moving the mechanism slidably within the passageway. Electrical means include arc voltage sensing means operatively associated with the motor and with the electrode in the holder. The motor is automatically actuated in response to arc voltage and fluctuations to move the holder mechanism relative to the nozzle and body.

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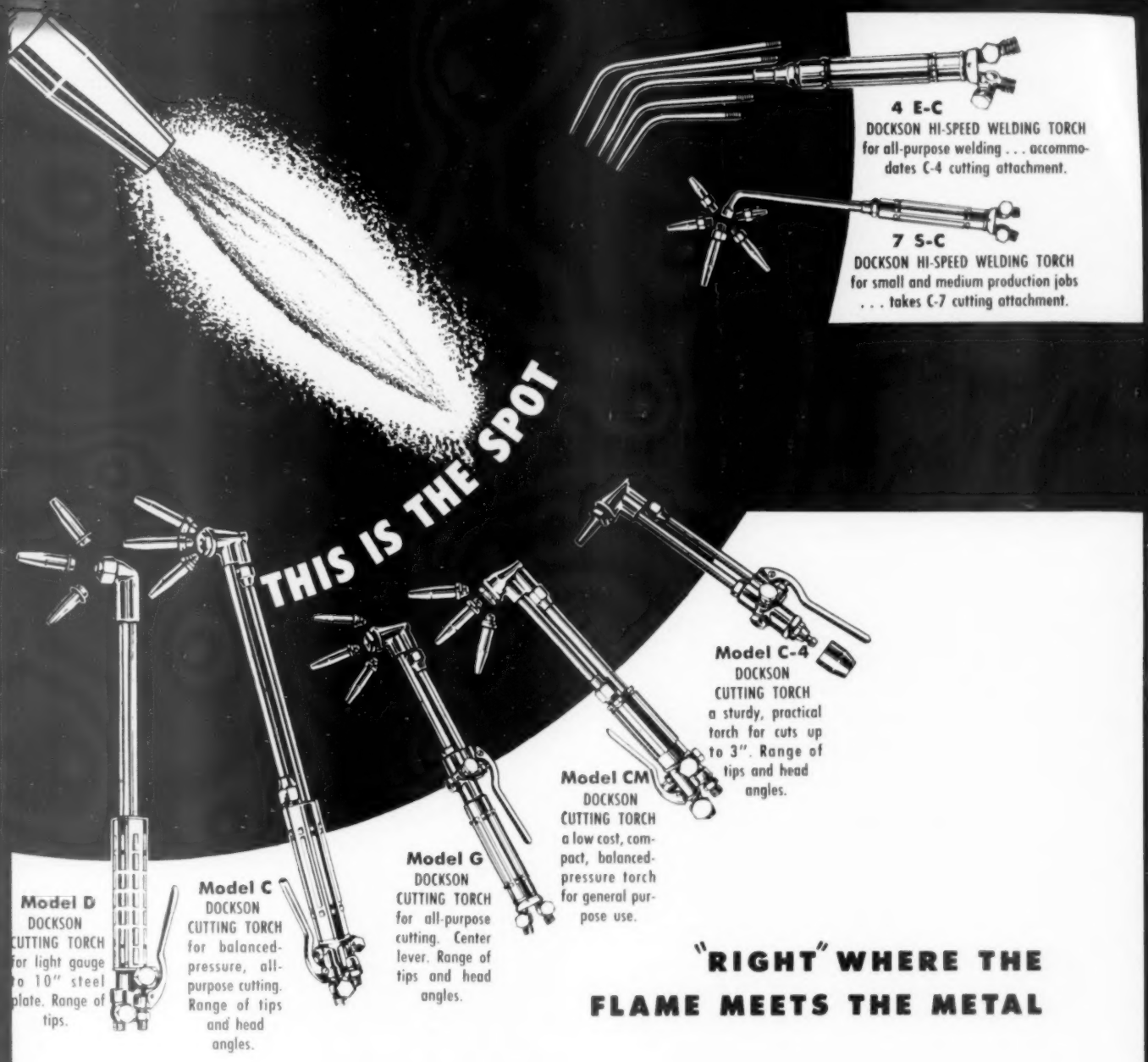

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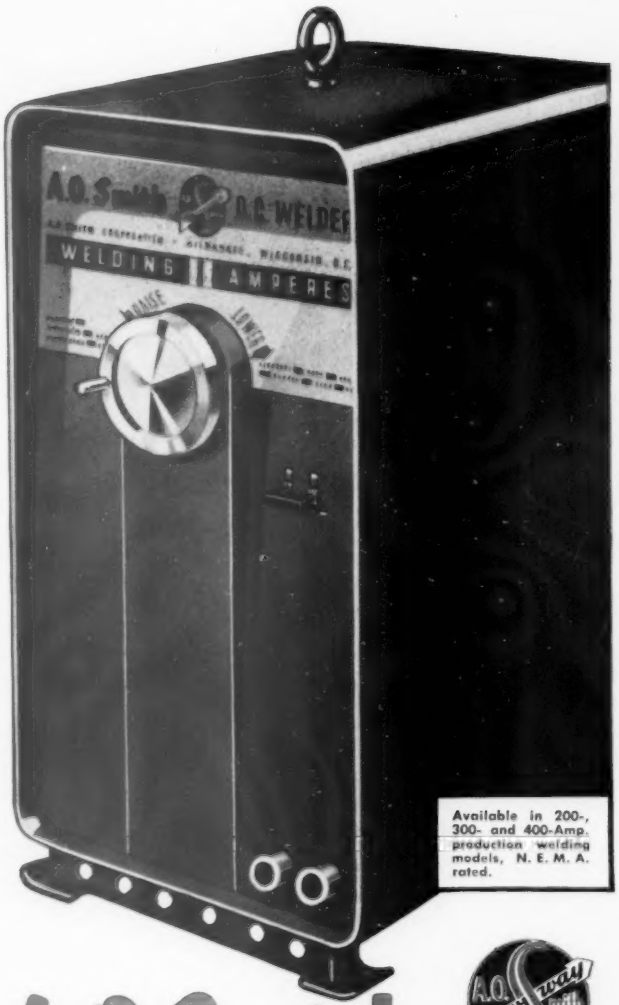

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